

Evaluation of Agricultural Policy Reforms in Japan



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Foreword

This report is an analysis of the Japanese agricultural sector and Japanese agricultural policy. It was undertaken as a part of the OECD's continuing work on Member countries' policies and contains evaluation and recommendations based on the principles for agricultural policy reform as expressed by OECD Ministers. The report looks at the evolution of Japanese agricultural policy over the last several decades, but maintains its analytical focus on policies currently in place. In addition to reporting a wide variety of statistics, much of which were provided by the Ministry of Agriculture, Forestry and Fisheries (MAFF), use was made of the OECD PSE/CSE database and the OECD Policy Evaluation Model (PEM) for some of the analytical work.

The authors of the report are Roger Martini and Shingo Kimura. Editorial and statistical preparation was carried out by Michèle Patterson. All the authors are with the OECD Directorate for Trade and Agriculture. The report has benefitted from input from many different individuals, including Dr. Shogenji and Dr. Ando of University of Tokyo, Dr. Ohga of Nihon University, and Dr. Shobayashi of Gakushuin Women's College. All responsibility for the final work remains with the authors. This report was declassified by the Working Party on Agricultural Policies and Markets of the Committee for Agriculture in April 2009.

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Executive Summary

Agriculture faces many challenges as it seeks its role in 21st century Japan. For rice, a major staple product and for many the defining product of Japanese agriculture, these challenges are particularly acute. Small average farm sizes and small and fragmented plots of land are farmed by a work force that is older than average and aging more rapidly than the general population. A history of support and protection have resulted in a sector that many feel is uncompetitive and ill-equipped to participate on a level playing field, either with other sectors of the economy or internationally.

At the same time, many parts of Japanese agriculture are thriving. Production of livestock products, beef in particular, has grown strongly, and there is evidence to suggest that producers of fruits and vegetables have been successful at using their comparative advantages to prosper in the marketplace. These products are produced by business-oriented farms that are less susceptible to the scale problems faced by the rice sector. Exports of these products have increased by 60% in recent years, and this growth is expected to continue. Nevertheless, many agricultural products continue to receive high levels of support and protection by OECD standards.

Recently, policy-makers in Japan have focussed their attention on improving the competitiveness of the agricultural sector by directing some important payment programmes to larger farms, as well as reforming land regulations to make it easier for farms to increase in size. These efforts are a good start in the process of putting agriculture in Japan on a competitive footing, but to be successful, this approach will need to be reinforced by additional reforms that address the market distortions that adversely affect the efficiency and competitiveness of the sector. Barriers to competition will need to be lowered, first among farmers themselves, and ultimately with other economic sectors and internationally.

While the amount of market price support has declined by more than 39% since 1986, this type of support, considered among the most market-distorting and least effective means of improving farm income, continues to amount for more than 90% of all support as measured by the PSE. Steps taken to date to reform the marketing of rice have laid the groundwork to improve market-orientation, and the next step is to scale back policies that have the effect of limiting the domestic supply of rice. Ultimately, moving from price-based support such as tariffs to payments based on land can improve farm incomes more effectively than the current policy set. Such a move also holds the potential to increase the share of paddy land actually used to produce rice and improve the environmental performance of the sector by promoting more extensive production.

The price of land is an important signal for the allocation of resources; currently this signal is confused by speculation and by disincentives that keep land from being utilised by the most efficient producers. The objective to preserve agricultural land is rooted in the many roles paddy land plays — as part of the social landscape, as a buffer for water flows and as a contributor to food security. Policies aimed at preserving land have also

had the effect of reducing the attractiveness of land rental transactions and has paradoxically led to under-use of agricultural land. Objectives to preserve land need to be met in a way that recognises the value of competing uses and the size of the market. In particular, targeting those agricultural areas that bring the greatest benefits with policies aimed at securing those benefits will work better than policies affecting the agricultural sector more broadly.

In rural policy as well, a targeted approach is called for. The importance of the agricultural sector in the rural economy has diminished to the point where agriculture can no longer be seen as the main driver of the rural economy. Policies directed at the agricultural sector are unlikely to significantly improve the rural economy, and depending on agriculture for rural development risks a conflict with the objective of improving agricultural competitiveness through structural reform.

Japan imports a significant proportion of its total food supply, making food security a prominent policy objective. The two main routes to improving food security are improving the efficiency of domestic production and trade agreements that ensure stable trading arrangements. Quantitative targets for food self-sufficiency are useful for measuring progress, but should not become an impediment to needed reforms. Domestic food that is more competitively priced for the consumer and a reduced amount of waste in the food chain will also bring improvements.

There are indications that Japanese agriculture can survive and thrive in a more open marketplace. Its ability to produce high-quality and specialised products for domestic and foreign markets is a key comparative advantage that can be exploited. Following that competitive advantage will mean that the sector has still more change to accomplish, and what form agriculture will take in the future is difficult to say. It is clear that enabling this change by providing greater opportunities to farmers to operate in a more open and competitive environment is essential to securing the long-term growth and competitiveness of agriculture in Japan.

Chapter 1.

Issues and Objectives in Agriculture

The changing face of agriculture

Agriculture has played a central role in the traditions and culture of Japan, extending to the very beginnings of recorded history. And within agriculture the defining image must be the paddy field, where rice is grown with great care and attention on small plots, each painstakingly cleared, made perfectly level and provided with water in precise amounts. The practical absence of pasture and the dominance of the rice paddy are a function of the nature of the land. Mountainous, with an abundance of rain but a scarcity of easily cultivated land, the territory of Japan lends itself to small plots, carefully attended. Carefully attended, because for most of its past, rice was the staple that fed the Japanese people, and its productivity and abundance was crucial for their well-being.

Today, Japan is an economic giant, the second-largest economy in the world with one of the highest standards of living, built upon decades of dynamic growth fostered by manufacturing, technology, and exports. Agriculture's role in the economy has diminished to a few per cent of the total, and its growth has fallen behind that of the other sectors of the economy. But it carries a powerful cultural force as the people, now mostly urban and prosperous, remain only a generation or two from their connection to farming, agriculture and the rural life.

Moreover, just as agriculture has been shaped by the terrain, agriculture has also helped shape the cultural landscape, such that for many Japanese, the rice paddy is an important part of an attractive landscape. While Japan no longer depends on the rice paddy for its survival, its place in the cultural landscape seems secure. The Japanese feel strongly about preserving the physical, cultural and traditional aspects of agriculture, and have expended considerable resources to do so.

To date, efforts to protect and preserve agriculture in Japan have led to mixed results. As a country whose wealth has come from trade and the exploitation of comparative advantage, the high tariffs that protect some agricultural products stand out as an exception, one that has slowed the further opening of markets. Efforts to keep resources such as land and labour in agriculture despite the draw from other parts of the economy have maintained the level of domestic agricultural production, but have distorted markets, leading to unexpected results such as land abandonment, speculation, and overproduction. Preserving rice production inevitably implies lost opportunities for other products, such as high-valued and specialty meat, fruit and vegetables that can be profitable and competitive in a land-scarce environment.

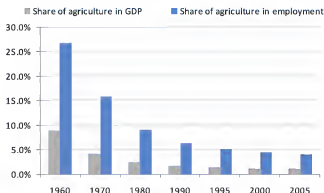
Japan has set out its objectives for agricultural policy in its Basic Law and Basic Plans. Major objectives have to do with preserving agricultural income, ensuring food security and maintaining cultural landscapes and other positive aspects of agriculture.

This study will look at the policies in place in Japan and how they have changed with a view to their success in meeting these objectives. It will suggest not only possible avenues to improve the effectiveness of these policies, but also ask the question of how the objectives may evolve to take into account the changing face of agriculture in Japan.

Trends in agriculture production and its role in the rural economy

Japan in 1960 was already a developed industrial nation, though agriculture still made up 9% of the economy and employed 28% of the labour force. Rice accounted for nearly half of the total value of production and dominated the planted area of the country. But at that point, the economic boom was in full swing, and agriculture would be unable to match the growth occurring in the rest of the economy. By 2005 agriculture would account for only 1.1% of GDP and 4% of total employment (Figure 1.1). Over this period, the number of agricultural workers declined by almost 80%. The relatively high share of labour in agriculture compared with the share of agriculture in GDP shows that, while labour productivity growth in agriculture was strong, in non-agricultural sectors it was even stronger. In fact, labour productivity growth in agriculture has been driven by competition for labour from other sectors of the economy as well as advances in production technology. By 1980, the conversion of the economy away from agriculture was essentially complete.

Figure 1.1. Contribution of agriculture to the economy, 1960-2005



Source: Statistical Annex to the Annual Report on Food, Agriculture and Rural Areas FY2008.

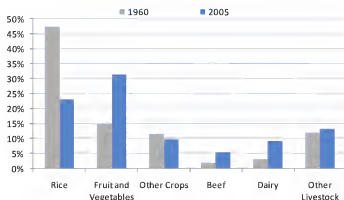
Agricultural production is dominated by rice production, though the predominance of rice has declined in recent decades as land is diverted from rice by a diversion programme and because of the increase in the importance of commodities where proximity to markets is important (making imports poor substitutes), such as flowers and vegetables. (Figure 1.2) Rice accounted for almost 50% of agricultural production value in 1960, but only 23.1% in 2005, lower than vegetables (23.5%). Beef production has been historically small, but has grown in recent years with the westernization of Japanese eating habits. The share of livestock in agricultural production value increased from 18.2% in 1960 to

30.1% in 2005. While aggregate production value has increased by a factor of four since 1960, driven by increasing prices, the volume of agricultural production has been flat since 1970.

Although all regions have their differences in agricultural production structure, the northern island of Hokkaido, which accounts for 13% of total agricultural production, stands out as unique in Japan. Agriculture in Hokkaido is characterized by its low dependence on rice production and high dependence on farm crops and dairy production. Hokkaido produces more than 40% of the major farm crops and dairy products in Japan.

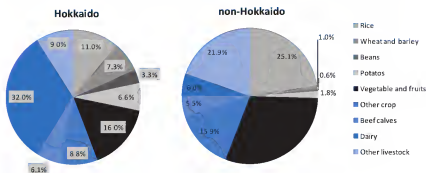
Figure 1.2. Value of production, 1960 vs. 2005

As per cent of total value of agricultural production



Source: Statistical Annex to the Annual Report on Food, Agriculture and Rural Areas FY2008.

Figure 1.3. Composition of agricultural production in Hokkaido and other regions in 2005



Source: MAFF.

Farm sizes are small on average, though average farm size is increasing (Table 1.1). On the island of Hokkaido, farm sizes are on average 17 times greater than in other regions. In Hokkaido more than half of farms are greater than 30 ha in size, while in the other regions, the majority of farms are less than 3 ha (Figure 1.4). Part of the difference in farm size can be explained by differences in off-farm opportunities. In Hokkaido, where non-farm employment is more limited, average farm size quadrupled in 40 years after 1965. Elsewhere in Japan, where local non-farm employment is relatively abundant, the average farm size expanded by only 20%. Competition for land also likely played a role in preventing farm expansion. In particular, the economic boom of the 1980s placed a strain on land markets as demand for land for residential and industrial development was strong. The slow pace of farm consolidation is another factor explaining the limited growth in average farm size.

While the size of many farm enterprises expanded strongly, farm size expansion has been relatively slow in the rice sector. While the size of livestock operations grew by between 17.6 times in the dairy sector and 216.4 times in the pig sector between 1965 and 2005, the average size of rice farms increased only by 70% from 0.6 ha to 1.0 ha in the same period. Many of these small rice farms would not be economically viable as stand-alone operations, but continue to operate as a result of labour-saving technology that enables rice farmers to continue operating while at the same time engaging in non-farm employment. Individuals who pursue rice production during the weekends face a lower opportunity cost of labour. Some of these smaller operations may also persist for reasons other than the revenue from rice production, reasons which may include maintaining the farm as a hobby, to produce for own-consumption or to maintain the family plot.

Rice's traditional importance, and the connection that many feel to the culture of rice production, is evident in the pattern of production by farm type (Figure 1.5). While virtually every other commodity is produced on a commercial basis by business farms, rice is produced by a wide range of farm operators, as a business, part-time business and non-commercial activity. More than 60% of rice production comes from farms that are not considered business farms but grow rice on a part-time basis. The farm enterprise with the next-highest amount of non-business operators is fruit production, with barely half that proportion of sub-business or side-business operations, at 33%.

Table 1.1. Farm size, 1965-2005

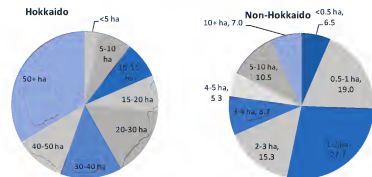
	1965	1975	1985	1995	2005	Ratio of 2005 to 1965
<i>Region</i>						
Hokkaido (ha)	4.09	6.76	9.28	12.64	16.45	4.0
Other than Hokkaido (ha)	0.79	0.8	0.83	0.92	0.95	1.2
<i>Agricultural products</i>						
Rice (ha)	0.58	0.60	0.61	0.85	0.96	1.7
Dairy (head)	3.4	11.2	25.6	44.0	59.7	17.6
Beef cattle (head)	1.3	3.9	8.7	17.5	30.7	23.6
Pigs (head)	5.7	34.4	129.0	545.2	1233.3	218.4

Farm size is the average operational size of each commodity enterprise in a farm household. Rice farming includes only commercial farm households after 1995. Pig data in 2005 is from 2004.

Source: MAFF.

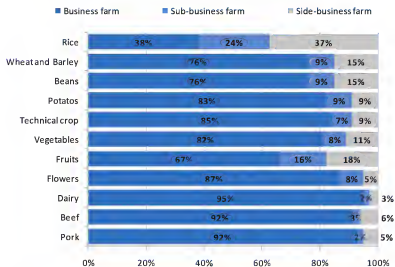
Figure 1.4. Proportion of farmland cultivated by different size of farm, 2005

As per cent of total farmland



Source: MAFF.

Figure 1.5. Agricultural production by farm types



Business farm households earn more than half of household income from farming and engage in farming more than 60 days. Sub-business farms also engage in farming more than 60 days per year, but earn less than half of household income from farming. Side-business farms engage in farming for less than 60 days per year (Box 1.2).

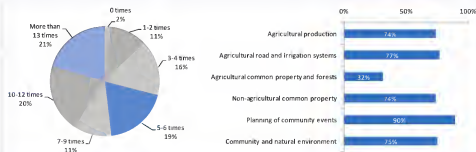
Source: MAFF.

Box 1.1. Rural communities in Japan

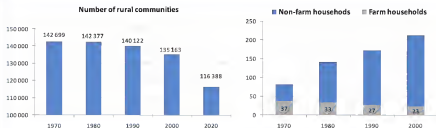
Historically, rice farming has been undertaken all over Japan following the development of irrigation. Small and fragmented land holdings share irrigation facilities as a non-excludable common property. For the system to work and distribute water to all plots, all farmers must co-ordinate and co-operate. Rice farming is also frequently carried out through collective action such as planting, water management and insect extermination. This practical co-dependence on the part of rice farmers builds close-knit rural communities.

These long-term continuous transactions create close personal ties and mutual trust between farmers, through which farmers voluntarily cooperate with each other. Thus, farmers live close to each other and form stable rural communities (Shuraku) with their own culture and tradition. The rural community functions as a self-governing body and is unified not only by management of common agricultural property and cooperation in agricultural production but by various aspects of rural life such as ceremony, police, fire brigade and social security.

The 2005 agricultural census indicates that 98% of agricultural communities (Nogyo Shuraku) hold community meetings more than once a year and more than half had meetings more than seven times a year. These meetings discuss matters such as agricultural production and planning of community events. The 2005 agricultural census showed that, of the communities that held meetings, 74% discussed agricultural production matters and 90% planned community events. Rural communities are still tied together by strong personal relationships and mutual trust.



However, rural areas have seen significant change in the past thirty years. Reduced population due to aging and migration to cities led to fewer rural communities with a different character. These changes have accelerated in recent years. Around 5 000 rural communities became non-functioning (e.g. no longer able to manage common property) between 1990 and 2000, and another 18 775 rural communities are forecasted to become non-functioning by 2020. Analysis by the policy research arm of MAFF (PRIMAFF) finds that this loss of community function is in relatively large rural communities in urban regions and small communities in mountainous regions. The share of non-farm households in rural communities is also increasing, rising from 54% to 89% since 1970. Non-agricultural development in near-urban areas has led to fewer, larger communities that do not have the same degree of community interdependence.



The heterogeneous nature of the rice producer is a challenge for rice policy. Different types of producers may react differently to policy-based incentives, and a single policy approach may be ineffective. A targeted approach that is tailored to the intended group is likely to be helpful under such circumstances. On the other hand, the demographic profile of agriculture suggests that the number of farmers will reduce in the future, a necessary condition for average farm sizes to increase.

These small operations do not exist in isolation; they form part of a web of interdependencies at the community level which help to preserve them (Box 1.1). The question of farm size and consolidation is not simply a matter of firms finding the most economically efficient scale, but is complicated by matters related to the rural economy and the local community. The historically strong bonds between rice producers help to sustain rural communities but can make change difficult to achieve as it prevents producers from unilaterally changing their operations.

Trends in food consumption

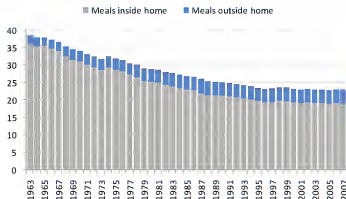
Increases in food consumption and the diversification of the diet away from traditional foods is an expected result of economic growth and globalisation as well as the decrease in the share of food expenditure in household expenditure (Figure 1.6). In Japan, demand for meat and dairy products has increased strongly as a result of both affordability and westernisation of the Japanese diet (the decline in beef in 2005 is influenced by the emergence of BSE). These products have seen consumption growth of between 400% and 700% in the last 40 years, while consumption of rice and cereals have declined substantially (Figure 1.7).

The change in the Japanese diet away from traditional food towards more energy-dense and convenience-food items, has raised concerns about negative impacts on health (Figure 1.8). While Japan has the lowest obesity rate among OECD countries (OECD Health Database, 2005), concerns about the growing obesity rate have brought attention to the diet changes that have taken place (Figure 1.9). There is evidence that obesity levels are rising, and with it associated diseases such as diabetes and heart disease.¹ A high domestic price of rice relative to other commodities may be putting traditional dishes at a comparative disadvantage in the marketplace, and if rice continues to be excepted from increasing trade liberalisation this disadvantage will increase over time.

As the population ages, the per-capita caloric requirement is expected to decline, and an older population is expected to demand different types of food, with a greater emphasis on pre-prepared and convenience items. The changing dietary needs of an older population may help to explain the trend in the data to lower total calories per person but a higher proportion of fat in the diet.

1. Yumi Matsushita *et al.*, *Trends in Childhood Obesity in Japan over the last 25 years from the National Nutrition Survey*. *Obesity Research*, Vol. 12, No. 2, February 2004.

Figure 1.6. Share of food consumption in household consumption expenditure



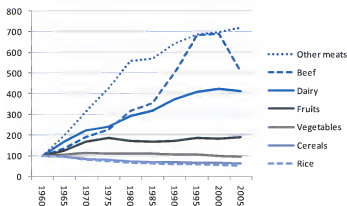
Sample households are non-agricultural households that have more than two members.

Food consumption included consumption of alcoholic beverage consumption.

Source: Household Expenditure Survey, Ministry of Internal Affairs and Communications.

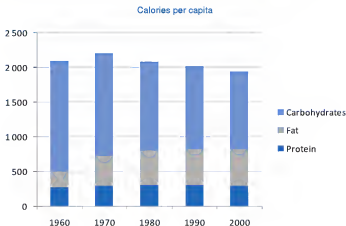
Figure 1.7. Evolution of per capita food supply, 1960-2005

1960=100



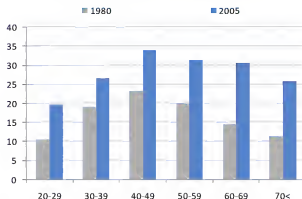
Source: Food balance sheet FY2006.

Figure 1.8. Changes in daily calorie intake, 1960-2000



Source: National Health and Nutrition Survey, Ministry of Health, Labour and Welfare.

Figure 1.9. Trends in obesity rate by age group



Obesity is defined as having a BMI over 25.

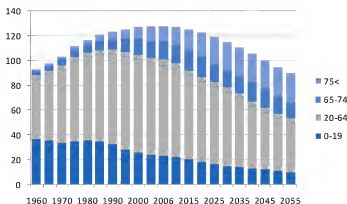
Source: National Health and Nutrition Survey, Ministry of Health, Labour and Welfare.

The population in Japan is estimated to have reached its peak of 128 million in 2006 and has now begun to decline (Figure 1.10). This decline is expected to result in a population approximately 30% below its peak level by 2055, which implies a rate of decline of 0.7% per year. A declining population will also have an older age structure--the proportion of the population aged more than 65 years old is expected to reach 30% by

2025 and 40% by 2055. This demographic change will affect the agricultural sector both through changes in demand for agricultural products and changes in the labour supply. As the agricultural population is already older than average, the agricultural sector will be one of the first to feel the effect of the changing structure of the population.

Food self-sufficiency is an important policy issue in Japan. The self-sufficiency ratio on a caloric basis (the ratio of calories produced to consumed domestically) has declined significantly since 1960. Part of this decline has been a result of lower production, but a part has also been a result of the rapid increase in the population in the post-war period. The demographic pressure on food self-sufficiency has now disappeared, and will reverse significantly over the coming decades.

Figure 1.10. Projection of future population



Source: National Institute of Population and Social Security Research.

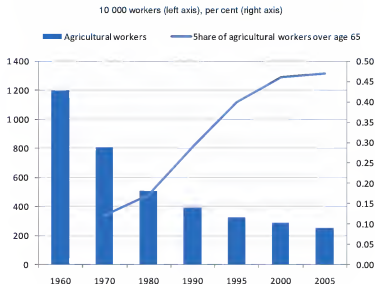
Demographics have in the past also put pressure on the land market in Japan. Strong economic growth combined with population growth in the post-war period have until recently led to demand for land to be converted to residential or industrial use, in particular in near-urban areas. This pressure necessitated strong controls to maintain land in agricultural use, which hampered the efficient operation of land markets and led to speculative price premiums. This pressure has relaxed significantly as the growth rate of the economy slows and the population growth rate moderates and reverses. Natural demographic change will have a positive influence on the ability to achieve objectives in food self-sufficiency and land preservation.

Farm labour and the structure of the farm enterprise

Growth in the demand for labour from other sectors has had a significant impact on the agricultural labour force. With many choosing to leave farming and fewer new entrants, the number of farm households declined by 50% and farm labour by 80% between 1960 and 2005. These movements have also led to an agricultural workforce that is older than in other sectors. While the proportion of the population aged more than

65 years old rose from 9.1% in 1980 to 20.1% in 2005, the share of farm workers that are more than 65 years old increased from 17% to 47% during the same period (Figure 1.11). Similarly, the proportion of full-time farm households that do not have a family worker under 65 years old of age rose from 32% in 1980 to 58% in 2005.

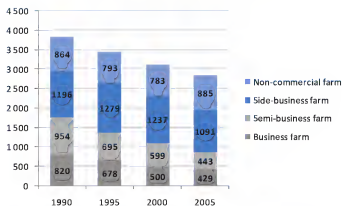
Figure 1.11. Size and age structure of the agricultural labour force, 1960-2005



Source: Statistical Annex to the Annual Report on Food, Agriculture and Rural Areas FY2008

The development of local off-farm employment has resulted in a farm household that today is mainly dependant on non-farm income. Full-time farm households declined from 34% in 1960 to 11% in 2005, whereas Type 2 part-time farms increased from 32% to 43% in 2005 (Box 1.2). The number of business farm households halved in the last 15 years while the number of side-business and semi-business farms remained steady (Figure 1.12). As of 2005, 15% of farm households are classified as business farm households. The share of farm income in total income is 74.8% for business farm households, but it is only 10.4% and 6.4% for sub-business and side-business farms, respectively (Figure 1.13).

Figure 1.12. Number of farm households by type
Ten thousand households



Source: Statistical Annex to the Annual Report on Food, Agriculture and Rural Areas FY2006.

Box 1.2. Definition of the farm household in Japanese agricultural statistics

A farm household in Japan's agricultural statistics is a household which cultivates more than 0.1 hectare of land or has more than JPY 150 000 in annual sales of agricultural products. Since the 1990 census, farm households are divided into **Commercial farm households** and **Self-sufficient farm households**. Commercial households are farm households which cultivate more than 0.3 ha of land or sell more than JPY 500 000 of farm products and are further sub-categorized as follows according to the extent of non-farm employment.

Business farm household: a farm household whose farm income is more than half of total household income and which has at least one family member (less than 65 years old) engaged in farming more than 60 days.

Semi-business farm household: a farm household whose farm income is less than half of total household income and which has at least one family member (less than 65 years old) engage in farming more than 60 days.

Side-business farm household: a farm household in which no member either engages in farming more than 60 days or is less than 65 years old.

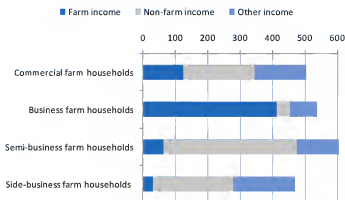
Full-time farm household: a farm household in which no member engages in non-farm employment for more than 30 days or who is self-employed with income more than JPY 150 000.

Part-time farm household type 1: farm household where at least one member engages in non-farm employment and whose farm income exceeds their non-farm income.

Part-time farm household type 2: farm household where at least one member engages in non-farm employment and whose non-farm income exceeds their farm income.

Figure 1.13 Sources of household income, 2005

JPY 1 000



Non-farm income does not include the non-farm income of household member who did not engage in farming.

Source: MAFF.

A key goal of agricultural policy in Japan has been to ensure that the returns from farming are roughly the same as from non-farm sectors. In practice, this means achieving a return to labour in agriculture equal to the return to labour (wage rate) in the rest of the economy. Farm income typically forms less than the majority of household income in farming households, whose income is already compatible with the national average despite any difference in returns to labour. Reducing the productivity difference between the agricultural and manufacturing sectors by increasing agricultural productivity is intended to help maintain agriculture as an economic enterprise. This has been a difficult goal to achieve in practice, and agricultural productivity remains significantly below that for the manufacturing sector (Table 1.2). In 1960 net output per worker in the agricultural sector was 20.7% of that in the manufacturing sector. While net product per worker in the agricultural sector relative to that in the manufacturing sector gradually increased to 29.2% in 1995, it has declined recently to 20.3% (2005). At least part of the explanation for the productivity difference lies in the relative importance of part-time work in the agricultural sector; in general, productivity of part-time workers often lags that of full-time workers. Maintaining high domestic prices for agricultural commodities has been an important policy tool used to increase the value of output per worker.

Table 1.2. Comparison of net product per worker

	1960	1970	1980	1990	1995	2000	2005
Nominal net product per agricultural worker	98	343	1 040	1 737	1 730	1 393	1 320
Nominal net product per manufacturing worker	474	1 516	3 941	6 094	5 931	5 847	6 496
Agricultural productivity as % of manufacturing	20.7%	22.6%	26.4%	28.5%	29.2%	23.8%	20.3%

Source: Statistical Yearbook of MAFF and Annual Report on National Account, Cabinet Office.

The difference in labour productivity growth between agriculture and manufacturing has been significant, but not dramatic. Between 1960 and 2005, labour productivity in manufacturing grew by 4.3% on average annually, while in the agricultural sector it grew at 3.9% (Table 1.3). However, the roots of productivity growth in the two sectors have been quite different. While labour productivity growth in the manufacturing sector is led by an annual growth rate of production that averaged around 4.7% and employment growth of 0.4% annually, the opposite is true for agriculture. Economic development over the post-war period followed a now familiar pattern of development—rapid growth and capital investment in manufacturing led to strong expansion of the non-agricultural sector and demand for labour to support it. The agriculture sector provided the required labour by increasing labour efficiency and releasing labour to other sectors in the economy. Growth in agricultural employment was a negative 3.4% annually, while agricultural production was relatively stable with 0.4% annual growth.

Table 1.3. Comparison of labour productivity growth

	1960-65	1965-70	1970-75	1975-1980	1980-85	1985-90	1990-95	1995-2000	2000-05	1960-2005
Agriculture										
Production index	2.3%	2.3%	1.1%	-0.2%	2.0%	-0.8%	-0.9%	-1.2%	-1.0%	0.4%
Employment index	-3.9%	-3.7%	-6.2%	-3.0%	-2.6%	-2.5%	-3.6%	-2.5%	-2.6%	-3.4%
Labour productivity	6.4%	6.3%	7.8%	2.8%	4.7%	1.7%	2.7%	1.4%	1.7%	3.9%
Manufacturing										
Production index	11.2%	15.8%	1.8%	6.2%	3.5%	4.5%	-0.9%	0.9%	0.3%	4.7%
Employment index	4.0%	3.7%	-0.5%	0.3%	1.2%	0.7%	-0.7%	-1.9%	-2.9%	0.4%
Labour productivity	6.9%	12.0%	2.3%	5.8%	2.2%	3.8%	-0.2%	2.9%	3.2%	4.3%

Source: *Agricultural Production Index*, MAFF and *Indices of Industrial Production*, Ministry of Economy, Trade and Industry.

By early 1970 the average per-person income in farm households exceeded that of non-farm households (Table 1.4). Income growth in farm households is driven by increasing non-farm income, which went from 51% in 1960 to 83% of total only 20 years later. The share of total farm household income derived from farming has stabilised at around 15% since 1980.

Table 1.4. Comparison of household income between non-farm and farm households

JPY thousands							
	1960	1970	1980	1990	1995	2000	2003
Non-farm households							
Total Income	491	1 355	4 196	6 261	6 850	6 731	6 295
Income per household member	112	348	1 096	1 692	1 913	1 946	1 804
Farm households							
Total Income	443	1 592	5 594	8 399	8 917	8 280	7 712
(Relative to non-farm households)	90%	117%	133%	134%	130%	123%	123%
(Share of farm income)	49%	32%	17%	14%	16%	13%	14%
Income per household member	77	326	1 271	1 967	2 118	2 080	2 051
(Relative to non-farm households)	69%	94%	116%	116%	111%	107%	114%

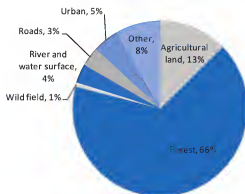
Non-farm household is a worker's household with 2 or more household members. The data exclude agricultural, forestry and fishery households (except for 1960).

Source: *Statistical Annex to the Annual Report on Food, Agriculture and Rural Areas in FY2008*, MAFF and Statistical Survey Department, Statistics Bureau, Ministry of Internal Affairs and Communications.

Land use

Japan is a mountainous island archipelago formed through volcanic action. Its rugged geography means that only 30% of its area—11.3 million ha—is suitable for agriculture or urban use (Figure 1.14). At the same time, the population of approximately 128 million people makes Japan the tenth most populous nation on earth. Given this, it is not surprising that land scarcity remains a challenge for agriculture. Of 4.7 million ha of farmland, 34% was situated in hilly areas, 29% in flat areas, 27% in urban areas and 9% in mountainous areas in 2005. While Japanese agriculture is already able to produce very high yields and so uses land intensively relative to other OECD countries, the value of land for rice production is below that for alternative uses in some areas (near-urban zones in particular).

Figure 1.14. Land use



Source: *Annual Report on Land*, Ministry of Land, Infrastructure and Transportation.

While 1.5 million hectares of new farmland were opened, pressure for conversion of land to non-agricultural uses and other factors contributed to the loss of 2.9 million ha of cultivated land area between 1960 and 2005, leading to a net loss of 1.4 million ha of cultivated area of land (Table 1.5). The conversion of farmland to non-agricultural use has been the major explanation for the reduction of cultivated land up to the early 1990's. After that time, unfavourable economic conditions led to a reduction in the rate of conversion of farmland to non-agricultural use such that land abandonment now plays a more significant role in the reduction of cultivated land over the last ten years (Figure 1.15). It is likely that the introduction of direct payments plays a role in the lower rate of land abandonment in recent years, specifically as a result of introduction of the direct payments to mountainous and hilly areas in 2000. Nevertheless, the proportion of abandoned land in total farmland increased from 2.6% to 9.7% between 1980 and 2005 (Figure 1.16). The proportion of abandoned land is highest in mountainous farming areas (14.7%), followed by urban areas (12.7%) and hilly farming areas (12.6%). Flat farming area has the lowest rate of land abandonment (5.6%). Whether land abandonment is primarily due to unfavourable economics of farming or a result of policies designed to keep land in agriculture and prevent land conversion likely varies depending on the area.

Table 1.5 Change in land use 1960-2005

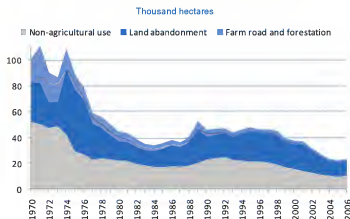
	1960	1970	1980	1990	1995	2000	2005
Total farmland (thousand ha)	6 071	5 796	5 461	5 243	5 038	4 830	4 692
Planted area (thousand ha)	8 129	6 311	5 706	5 349	4 920	4 563	4 384
Effective use rate of land ¹	134%	109%	104%	102%	98%	94%	93%
Share of major crops in planted area							
Rice	41%	46%	42%	39%	43%	39%	39%
Grains	19%	8%	6%	7%	5%	7%	6%
Vegetable	10%	13%	13%	14%	14%	14%	13%
Beans	8%	5%	5%	5%	3%	4%	4%
Feed crop	6%	12%	18%	20%	21%	22%	23%
Other plants	5%	4%	5%	4%	4%	4%	4%
Fruits	3%	7%	7%	6%	6%	6%	6%

1. Effective use rate of land is a function of the amount of land idled and the amount of land where multiple crops are produced in a year. For example, if all crop land was planted twice a year, the effective use rate would be 200%.

Source: Statistical Annex to the Annual Report on Food, Agriculture and Rural Areas FY2008.

Planted area has decreased at a faster rate than has total farmland. While total farmland area declined by 23% between 1960 and 2005, planted area declined by 46%, mainly due to the temporary abandonment of land and the production adjustment policy which discourages rice production. Rice remains the most important crop in terms of planted area, accounting for 38.9% of all planted area in 2005, followed by feed crops (23.5%) and vegetables (12.8%).

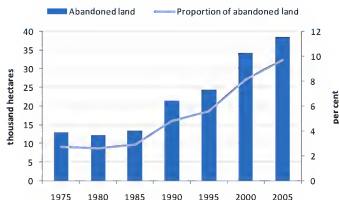
Figure 1.15. Yearly loss of farmland by cause 1970-2006



Abandoned land in cultivated and plant area survey is defined as the land that is used for agriculture, but in a condition such that it can no longer be cultivated. Abandoned land area before 1992 includes land converted to dam and reservoir construction and for river improvements.

Source: Cultivated and Planted Area Survey, MAFF.

Figure 1.16. Trend in land abandonment, 1975-2005



Abandoned land in the agricultural census is defined as owned land that has not been cultivated for more than one year and whose owner does not intend to cultivate in the next few years.

Source: Agricultural Census, MAFF.

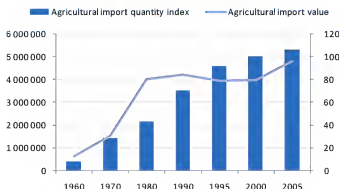
Agricultural trade

Japan is the largest net importer of agricultural products in the world, importing 22 times more than it exports by value. Although the share of agricultural products in total imports dropped from 38.5% in 1960 to 8.4% in 2005, the value of agricultural imports and the physical quantity of agricultural imports are increasing (Figure 1.17). Conversely, agricultural exports account for only 0.3% of total export value. The value and volume of exports has been increasing gradually in recent years.

Whereas almost 80% of total calorie intake came from domestically-produced food in 1960, the calorie-based food self-sufficiency ratio has dropped below 40% in recent years. However, the degree of dependence on imports differs for different products. For example, while trade policy insures self-sufficiency in rice production and more than 95% of rice is produced domestically, domestically produced wheat and soybeans represent only 14% and 5% of domestic consumption, respectively (Table 1.6). Vegetables and dairy products have a relatively higher self-sufficiency ratio of 79% and 66%, respectively as the domestic versions of these products are less readily substituted by imports. Thus, in terms of the total value of food consumed, the self-sufficiency ratio was 68% in 2006, as relatively more higher value products are produced domestically. After trade was liberalised in those products, the proportion of domestic beef and pork in consumption declined from nearly 100% in 1960 to 34% and 57% in 2000, respectively.

Figure 1.17. Value and volume of agricultural imports, 1960-2005

JPY million (left axis), 2000=100 (right axis)



Source: Statistical Annex to the Annual Report on Food, Agriculture and Rural Areas FY2006.

Table 1.6. Self-sufficiency in food production, 1960-2005

Per cent self-sufficiency

	1960	1970	1980	1990	1995	2000	2006
Total	79	60	53	47	43	40	39
Rice	102	106	100	100	103	95	95
Wheat	39	9	10	15	7	11	13
Soybean	28	4	4	5	2	5	5
Vegetable	100	99	97	91	85	82	79
Fruits	100	84	81	63	49	44	39
Dairy products	89	89	82	78	72	68	66
Beef	96	90	72	51	39	34	43
Pork	96	98	87	74	62	57	52
Feed	na	38	28	26	26	26	25

Total self-sufficiency rate is expressed on a caloric basis, while that for each commodity is expressed on a weight basis.

Source: Food Self-sufficiency Report (FY2008), MAFF.

While food imports are dominated by staples, primarily livestock meat and its feed, exports are diverse and made up of specialty and value-added products. The top ten food import items account for 40% of total imports while the top ten food exports account for 30% of total food exports (Table 1.7). That Japan is at the same time a major importer of meat and feeds for livestock demonstrates quality differentiation between domestic livestock production (beef in particular) and imports as well as the effect of higher tariff protection on livestock meat imports than its feeds.

Table 1.7. Main imports and exports of agricultural goods, 2004-06

Imports	JPY million	%	Exports	JPY million	%
Pork	1 376 215	9.6	Confectionary	63 640	9.7
Maize	903 292	6.3	Wheat flour	26 092	4.0
Fresh and dry fruits	696 846	4.8	Fresh and dry fruits	20 535	3.1
Beef	646 546	4.5	Lemonade, etc.	17 610	2.7
Soybean	498 374	3.5	Compound feed	16 241	2.5
Wheat	422 648	2.9	Raw hides of pig	15 500	2.4
Poultry and poultry products	335 744	2.3	Instant noodles	9 847	1.5
Frozen vegetables	312 751	2.2	Soy sauce	9 518	1.4
Coffee	283 211	2.0	Fresh, chilled and dry vegetables	8 372	1.3
Fresh vegetables	287 119	2.0	Green tea	6 863	1.0
Other	8 607 518	59.9	Other	462 502	70.4
Total	14 370 264		Total	656 521	

Source: MAFF.

The top ten main exporters account for almost 90% of total Japanese imports and represent most of the world's major agricultural exporting countries. China, Indonesia, and The Philippines are important regional exporters into Japan. Importers of Japanese products are mainly countries in the regions where similarities in diet make Japanese products attractive. The US is the most important trading partner, being the largest exporter and second largest importer (Table 1.8).

Table 1.8. Major trade partners, 2004-06

Imports	%	Exports	%
United States	30.9	Chinese Taipei	23.5
European Union	13.5	United States	19.1
China	12.8	Hong Kong	14.0
Australia	9.9	Korea	9.8
Canada	6.0	China	8.4
Thailand	5.6	European Union	6.8
Brazil	3.5	Singapore	3.1
New Zealand	2.5	Thailand	2.9
The Philippines	1.7	Australia	1.6
Indonesia	1.7	Canada	1.3
Other	11.7	Other	9.6

Source: MAFF.

Chapter 2.

Agricultural Policy in Japan

The objectives of agricultural policy in Japan are similar to those in many OECD countries; the maintenance of comparable income levels between agricultural producers and other actors in the economy, maintenance of a secure food supply, and preservation of the benefits that agriculture brings to landscapes and social benefits, including especially for rural economies. The difference is the context in which these objectives were formed and operate. Unlike many other OECD countries, Japan has a low level of food self-sufficiency, relatively scarce land resources, and historically small-scale producers. Nevertheless, many of the lessons of OECD policy research apply to Japan, and the results of this research suggest the potential to improve agricultural policy for the benefit of the sector and Japanese society as a whole.

In large part, the seeds of the current agricultural structure and policies were sown in the post-war period, with the reform of the landholding structure away from large landlords towards smaller farmer-owned operations. The trade-off in any such reform is between larger, more economically efficient operations and the greater social equality and security that come from creating a new land-holding class. Japan has benefited socially from this initial land reform, but has struggled since then with developing a sector that is as economically efficient and productive as other parts of the Japanese economy.

The objectives of agricultural policy are laid out in the Basic Law on Food, Agriculture and Rural areas, which requires the development and periodic revision of a Basic Plan that sets policy directions, approaches and targets (Box 2.1). In simple terms, the main objectives of agricultural policies have been threefold: To ensure an income from farm operations that is comparable to that in the rest of the economy, to provide for a secure food supply, and to obtain the desired multifunctional aspects of agriculture (in particular landscape preservation, preservation of traditional rural areas, and water management).

These objectives have been pursued through a few major policies, and a good deal of minor ones. The major approaches to agricultural policy involve maintaining self-sufficiency in rice through control of imports, a diversion scheme limiting rice output that leads to a higher domestic rice price, and maintenance of paddy area through infrastructure investments. The diversion scheme for rice is associated with direct payments that compensate for the lower revenue earned from the production of alternative, less profitable, crops. Recently, commodity payments that are restricted to larger farm operations or community farm associations have increased as a means of promoting economies of scale.

Box 2.1. New Basic Law on Food, Agriculture and Rural Areas

In July 1999, the New Basic Law on Food, Agriculture and Rural Areas replaced the Basic Law on Agriculture of 1961 following the recommendations of an advisory committee to the prime minister on basic problems concerning food, agriculture and rural areas. The main thrust of the basic law of 1961 was to reduce the disparity of productivity and income between agricultural and non-agricultural sectors, mainly through agricultural structural policies. The new basic law widened the scope of agricultural policy objectives to include food security, multi-functionality of agriculture and rural development. The basic principles of agricultural policy under the new basic law are the following.

- 1) **Securing stable food supply** through enhancing domestic production as a basis with an appropriate combination of imports and stockholding.
- 2) **Fulfilling the multi-functional role of agriculture** such as conservation of national land, water resources and natural environment and maintenance of desirable landscapes and cultural traditions.
- 3) **Sustainable agricultural development** by maintaining agricultural production basis including farmland, irrigation/drainage, and a workforce, promoting the natural cyclical function of agriculture and establishing a desirable agricultural structure where efficient and stable farm operators (whose farm income is comparable to the non-farm sector with equivalent working time) play a major role.
- 4) **Development of rural areas** through improvements in agricultural production conditions and rural welfare including living infrastructure.

The new basic law also stipulates that the government should establish a **Basic Plan for Food, Agriculture and Rural Areas**, including 1) basic direction in formulating policies on food, agriculture and rural areas, 2) A target rate of food self-sufficiency and 3) government policies implemented comprehensively and systematically with regard to food, agriculture and rural areas. The basic law requires that this plan be revised approximately every five years. The first basic plan was announced in March 2000, followed by the revision in March 2005.

In the first basic plan of 2000, the target rate of food self-sufficiency was set as 45% in 2010 on a calorie basis. The revised basic plan of 2005 maintained the target rate at 45%, but changed the target date to 2015 and added a target self-sufficiency rate of 75% on a production value basis. One of the most important aspects of the basic plan of 2000 was the introduction of a direct payment policy replacing some price support. The new basic plan of 2005 announced the introduction of direct payments for core farmers as a part of farm management stabilization measures.

As a policy to improve the structure of agricultural production, the first basic plan of 2000 stipulated the need to promote the incorporation of farm enterprises, which led to the deregulation of farmland law to allow private limited companies to purchase farmland under certain conditions. Aiming to hasten the process of structural adjustment, the second basic plan of 2005 stresses the importance of identifying the principal farmers who would be the foundation of a stable and efficient farm system and targeting policy support to these farmers. This includes community-based farming co-operatives which were identified as potential core farmers and these farming organisations are promoted by the plan. Moreover, the new basic plan stresses the importance of concentrating farmland to efficient and stable farm management and promotes new entrants to agriculture, including by further deregulation of farmland ownership law.

This chapter will look at the policies in place in the agricultural sector of Japan, and how they have changed over time. It is divided into several sections. In each section, descriptions of policies are supplemented with analysis that considers these policies in the context of the policy objectives set out by the Basic Plan and general OECD principles. The first section takes a general look at the overall policy set and the transfers it generates between consumers, taxpayers and producers, using the information in the OECD's Producer Support Estimate database. The sections that follow tackle in turn specific subject areas of agricultural policy:

- The second section deals with food security and trade policy. Food security as an objective has a lot to do with trade policy, in particular for rice, and understanding the

issues surrounding this issue help to explain the motivation behind policies related to rice production, considered in the following section.

- The third section covers rice policy, split into several subsections. Rice policy forms the core of agricultural policy in Japan, and many issues come into play in its objectives and design. Subsections deal with recent policy reforms and the level of support, structural issues in the sector (such as farm size, off-farm employment and aging), rice pricing policy and the important production adjustment programme that controls rice supply.
- The fourth section describes policies related to upland crops. This comprises most field crops other than rice and for which budgetary payments are relatively important. Production of these crops is also affected by rice policy, in particular as a result of the production adjustment programme.
- The fifth section explains policies related to land. Land policy and rice policy are closely tied, and the effects of land policies have wide-ranging implications for agriculture.
- The policies in the livestock and horticulture sectors are discussed in sections six and seven. These products are characterised by a higher level of product differentiation with a correspondingly lower level of import competition, and policies relating to them largely reflect this fact.
- Finally, section eight provides an analysis of sector-wide agricultural policies having to do with the rural economy and environment.

Overview of agricultural support

Transfers to producers

The OECD has calculated the Producer Support Estimate (PSE) since 1986 as a means to measure in a consistent way the amount of support provided to the agricultural sector by member countries. It is defined as the annual monetary value of gross transfers from consumers and taxpayers, arising from policies that support agriculture, regardless of their nature, objective or impacts on farm production or income. The PSE is expressed as an absolute value, nominal or real, or in the form of %PSE, which is relative to gross farm receipts. Whereas the PSE in gross terms represents the overall policy support for producers, the %PSE indicates the share of gross farm receipts explained by agricultural policy. PSE has two major components, market price support (MPS) and budgetary transfers. MPS measures the value of transfers arising from any policy that affects domestic market price such as tariffs, import quotas, production quotas, administered prices and public stockholding. On the other hand, budgetary transfers (and revenue forgone) measure transfers to agricultural producers other than through higher domestic market prices and are further sub-categorised according to the manner in which each policy is implemented (Table 2.1).

The nominal value of the PSE declined by 37% from JPY 7 236 billion in 1986-88 to JPY 4 541 billion in 2005-07. It also fell in percentage terms (PSE transfers as a % of gross farm receipts), from 64% to 50%. The evolution of the PSE shows a steady decline in producer support with periodic increases in the early 1990s, where high MPS came from a surge in rice production after the rice crop failure of 1993, and in 1997 (Figure 2.1). The %PSE generally tracks this trend, but showing a shallower net decline over the period. The decline in the level of PSE support is due to a combination of a

downward trend in production levels over time as well as a reduction in the level of price support, which has been declining due to domestic deregulation for rice and according to the schedule of tariff reductions in the URAA particularly in the case of livestock products.

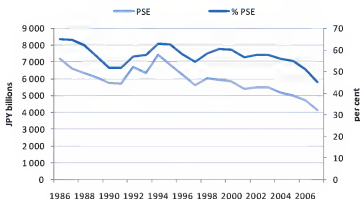
While declining over time, the level of support as measured by the %PSE is significantly above the OECD average, and Japan's %PSE is the 5th highest in the OECD. Over the 1986-2007 period, support has declined in all OECD countries with the exception of Turkey (Figure 2.2).

Table 2.1. PSE Classification of selected agricultural policies

Market Price Support	Payments based on output	Payments based on input use	Payments based on current A/An/RA, production required	Payments based on non-current A/An/RA, production not required
Tariffs	Direct payment for core farmers (wheat, barley, soybean, sugar beet and starch potato)	Insurance	Rice farmer's management support	Diversion program
Tariff rate quota	Rice Farming Income Stabilization Program (JRIS)	Interest concessions	Area payment (partnership between rice farm and livestock producer)	Direct payment for core farmers (Non-current area payment)
Administered price	Fruits and vegetable price stabilization fund	Fuel tax concessions	Direct payment for environmentally friendly farming	Hilly and mountainous area payment
Production adjustment policy	Delinquency payment for beef calves	Infrastructure (on-farm)		
	Compensatory payments for manufactured milk	Disaster restoration (on-farm)		
		Extension service		
		Animal pest and disease control		

Source: OECD PSE database.

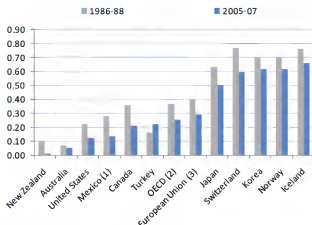
Figure 2.1. Nominal PSE and %PSE, 1986-2007



Source: OECD PSE database 2008.

Figure 2.2. %PSE in OECD countries, 1986-88 and 2004-07

In per cent of value of farm gross receipts



Countries are ranked according to 2005-07 levels.

1. For Mexico, 1986-88 is replaced by 1991-93.

2. Austria, Finland and Sweden are included in the OECD total for all years and in the EU from 1995. The Czech Republic, Hungary, Poland and the Slovak Republic are included in the OECD total for all years and in the EU from 2004. The OECD total does not include the non-OECD EU member states.

3. EU12 for 1986-94 including ex-GDR from 1990; EU15 for 1995-2003; EU25 for 2004-06 and EU-27 from 2007.

Source: OECD PSE database 2008.

The Nominal Assistance Coefficient (NAC) is the ratio of the value of gross farm receipts including support and gross farm receipts valued at border prices (at farm gate). It is a measure of the extent to which receipts come from the marketplace. The NAC and the %PSE are complementary in the sense that both measure the importance of support relative to revenue, but the NAC is more sensitive to the impact of changes in farm receipts when support levels are high relative to revenue. Japan's NAC remains above the OECD average, despite a decline from 2.76 to 2.03 between 1986-88 and 2005-07. That is, producer's gross farm receipts are 2.03 times higher than they would have been on the world market in 2005-07.

The Nominal Protection Coefficient (NPC) is the ratio between the average price received by producers (at farm gate), including payments per tonne of current output and the border price (at farm gate) and as such is a measure of the level of market protection provided to producers. The NPC in 1986-88 and in 2005-07 was 2.63 and 1.94, meaning prices received by farmers were 2.63 and 1.94 times higher than those in world markets, respectively, again a quite significant decline.

Table 2.2. NAC and NPC, Japan and OECD average

	1986-88	2005-07
Producer NAC		
Japan	2.76	2.03
OECD	1.51	1.25
Producer NPC		
Japan	2.63	1.94
OECD	1.6	1.41

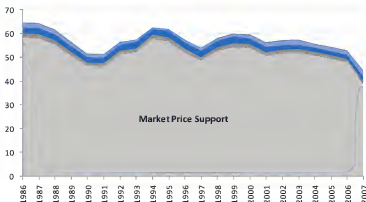
Source: OECD PSE database 2008.

Support is dominated by MPS, which comprises approximately 90% of the total PSE (Figure 2.3).¹ The combined share of the most distortive payments (payments based on commodity output and payments based on variable inputs without constraints) in the PSE declined slightly at around 95% in 1986-88 to 93% in 2004-07. Mirroring the overall reduction in nominal PSE, the level of MPS fell by 39% from JPY 6 487 billion in 1986-88 to JPY 3 960 billion in 2005-07. Budgetary and other transfers decreased by 22% from JPY 749 billion in 1986-88 to JPY 581 billion in 2005-07.

Figure 2.3. PSE level and composition by support categories, 1986-2007

Support based on:

- Market Price Support
- Commodity output
- Input use
- Non-current A/An/R/I, production not required



Source: OECD PSE Database 2008.

1. Since the products included in the MPS calculations cover less than two-third of the overall MPS for Japan, the rest of the MPS is calculated through extrapolation. Extrapolating the highly protected products (rice) to non MPS products is likely to overestimate Japan's MPS given Japan's tariff structure and domestic policy intervention.

The decline in the level of the PSE is mainly the result of declining MPS. Lower MPS explains 34.9% out of the 37.2% fall in PSE between 1986-88 and 2005-07 (Table 2.3). The reduction of budgetary and other transfer accounts for the remaining 2.3 percentage points of the fall in the PSE. Among these transfers, reduction of input use based payment is by far the most significant.

Japan has a significantly higher share (92%) of support based on commodity output than the OECD average (55%) (Figure 2.4). The share of payments which place no requirement to produce (5%) is also lower than the OECD average of 19%.

Table 2.3. Explaining the change in the PSE between 1986-88 and 2005-07

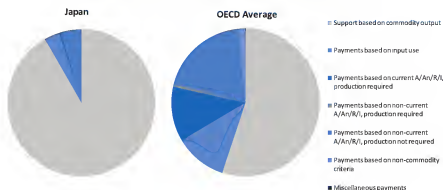
Change in PSE	-37.2%
Contribution of MPS	-34.9%
Contribution of budgetary transfers	-2.3%
payments based on output	-0.2%
payments based on input use	-2.1%
payments based on current A/An/R/I, production required	0.3%
payments based on non-current A/An/R/I, production not required	-0.3%

1. % change in national currency.

2. Contribution to % change is calculated if all other variables are held constant.

Source: OECD PSE database.

Figure 2.4. PSE Composition, Japan and OECD average, 2005-07



Source: OECD PSE database 2008.

Improving the composition of support could bring benefits to both farmers and consumers. Consider the following scenario, carried out using the OECD's Policy Evaluation Model (PEM) (Box 2.2). Market price support is reduced through a partial easing of the production adjustment programme for rice, complemented with a compensating payment of the same form as existing direct payments. In this scenario, the amount of paddy land diverted from rice production is reduced by 270 000 hectares, and

the direct payment is increased by a total of JPY 42.41 billion. While this results in only a modest change in the composition of the PSE, the welfare impacts are significant, indicating improved transfer efficiency to producers as well as benefits for consumers (Table 2.4).²

Box 2.2. Policy Evaluation Model

The Policy Evaluation Model (PEM) is designed to use policy information from the PSE database to determine the effects of policies and policy categories on economic outcomes such as production, trade and welfare. It is a partial equilibrium simulation model of the agricultural sector in six OECD regions and covers major crops (rice, wheat, grains, oilseeds) and livestock (milk and beef) products. The PEM applies standard economic assumptions to model output and factor markets and the interactions between them. Policy simulations typically take the form of a change in a policy, represented as a "wedge" between the supply and demand price of a commodity or factor of production. Adjustment to a new equilibrium after this change takes place by equating supply and demand in all markets and is determined by the elasticities of demand for commodities, elasticity of supply of factors and the elasticities of substitution between factors. Changes in welfare are measured by changes in the producer and consumer surplus in each market, and allocated to the relevant consumer or factor owner.

In addition to changes in the level of support as measured by the PSE, the model can also change other policies such as the import TRQ levels for rice and the amount of land affected by the production adjustment programme. More details about the implementation of the PEM for this study can be found in Annex 1. For more information on the PEM model, the document "The Six Commodity PEM model: Preliminary Results" contains a detailed description.

There are two ways in the model to reduce the MPS for rice; by increasing the amount of imports under the TRQ, or by allowing more rice to be produced domestically by reducing the amount of land diverted from rice production (the second of these is used here). Both of these lower MPS by allowing greater supply of rice into the domestic market—this lowers the domestic price and therefore the gap between the domestic and world price (termed unit MPS). Reducing the amount of land diverted from rice production is more favourable to producers as it reduces a constraint upon the allocation of land, and producers benefit from the ability to reallocate land to its most profitable use (see Figure A.1 in the Annex). Producers also benefit from the increased direct payment, resulting in an overall gain of JPY 74 billion. Consumers also benefit from the lower price of rice, which declines by about 4%.³ Taxpayers must fund the direct payment, but they also benefit from lower output payments associated with production of other commodities where production shifts in favour of rice production, and from increased tariff revenue for milk products, as the scenario results in a slightly higher domestic price for milk, resulting in a net cost to taxpayers somewhat less than amount of the increased direct payments.⁴ The total increase in welfare is estimated to be JPY 120 billion.

2. Some of the more technical details of this and other scenarios carried out in the PEM, including a description of changes in the model carried out for this study, are contained in Annex 1
3. The elasticity of demand for rice comes from the AGLINK database and is equal to -0.558 in the base version of the model. More inelastic demand would result in a lower equilibrium price of rice and a smaller increase in production than reported in this scenario.
4. Taxpayer welfare changes are equal to the net change in government expenditure under the scenario. This is composed both of changes in budgetary payments and changes in tariff revenue from imports when the domestic price is higher than the import price. In particular for Japan, tariff revenue is sensitive to small changes in prices. This is because for some commodities

This scenario simulates a change in the composition of the PSE—moving some support from MPS to a payment based on non-current production with production not required (category E in the PSE classification). The benefits of such a shift are demonstrated by the positive welfare effects for farmers and consumers. This demonstrates that reform that changes the composition of support but not its level can bring significant benefits through improved transfer efficiency and reductions in market distortions.

Table 2.4. Reforming the production adjustment programme combined with a larger direct payment

	Initial values	Simulation values	Change	Per cent change
Output market for rice				
Production (million tonnes)	8.56	8.77	0.21	2.50
Consumption	9.18	9.39	0.21	2.33
Trade	-0.62	-0.62	0.00	0.00
Producer price (1 000 JPY/tonne)	218.75	210.21	-8.54	-3.90
Land market				
Paddy land (million hectares)	1.69	1.96	0.27	16.00
Paddy land rental rate (1 000 JPY)	206.02	171.97	-34.05	-16.53
Welfare impacts (JPY billions)				
Farmers	-	74.95	-	-
Consumers	-	78.98	-	-
Taxpayers	-	-29.87	-	-
Input suppliers	-	-3.77	-	-
Total change in welfare	-	120.29	-	-
PSE impacts (JPY billions)				
Rice MPS	1 363.24	1 322.40	-40.84	-3.00
Payments based on non-current production, production not required	170.13	212.54	42.41	24.93

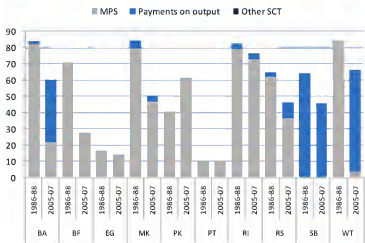
Source: OECD PEM.

Single commodity transfers (SCT) are those transfers that are related to the production of a single specific commodity. For example, the transfer that arises from a high domestic price of rice achieved through tariffs is specific to rice in the sense that rice producers and only rice producers benefit directly from the transfer. The percentage SCT is similar in concept to the %PSE; it measures support provided as SCT as a share of total receipts for that commodity. The %SCT of rice decreased from 83% in 1986-88 to 77% in 2005-07, indicating that 77% of rice revenue was in the form of policy transfers (Figure 2.5). The proportion of MPS in %SCT remained unchanged at around 95%. In the case of wheat, the %SCT remained high at 85% in 1986-88 and 67% in 2005-07. Similarly, the proportion of payments based on output in producer SCT for barley increased from 2% in 1986-88 to 64% in 2005-07. The changes for wheat and barley have

imports form a large percentage of total consumption and the difference between domestic and world price is large (tariff revenue is equal to the price difference times imports).

to do with the abolition of the administered price and the introduction of direct payments based on output. For livestock products, the %SCT of beef decreased significantly from 71% in 1986-88 to 28% in 2005-07 due to the removal of the import quota starting in 1991. Milk had one of the highest %SCT of 84% in 1986-88, but it was 51% in 2005-07. The %SCT for pig meat increased from 41% in 1986-88 to 62% in 2005-07.

Figure 2.5. Producer SCT by commodity, 1986-88 and 2005-07



BA=Barley, BF=Beef, EG=Eggs, MK=Milk, PK=Pig meat, PT=Poultry, RI=Rice, RS=Raw Sugar, SB=Soybeans, WT=Wheat.

Source: OECD PSE database 2008.

The level of MPS for MPS commodities has declined by 41.2% since 1986-88. This decline is due to both a reduction in output, reducing the base to which support is applied, and the amount of MPS for each unit of output (termed unit MPS). The MPS for rice, which accounts for more than one-third of all MPS, dropped by 46.8% between 1986-88 and 2005-07. Of this, 31.7% is due to the fall in unit MPS and 15.0% is explained by a decrease in production.

The decline in the unit MPS can be further decomposed into components, most importantly the part due to a lower domestic price for producers, and the part due to a higher world (reference) price. For rice, wheat and barley, the reduced gap between domestic and world prices results mainly from lower domestic prices (Table 2.5). For livestock products, the picture is less clear. For beef, higher world prices account for most of the decline in unit MPS, and for milk it is a combination of the two factors. For pork, the unit MPS has increased. The domestic price of pork has fallen, but the world price has fallen even more, resulting in a unit MPS 27.5% higher than in 1986-88.⁵

5. A change in the data source for the world reference price for pork may explain part of this change.

Table 2.5. Drivers of change in MPS 1986-88 to 2005-07

	Rice	Wheat	Barley	Beef	Pig meat	Milk
Change in MPS	-46.8%	-96.7%	-91.2%	-65.5%	3.8%	-46.3%
Resulting from a change in quantity	-15.0%	-2.6%	-29.2%	-7.9%	-23.8%	6.2%
Resulting from a change in unit MPS	-31.7%	-94.1%	-62.0%	-57.5%	27.5%	-52.5%
Unit MPS change due to producer price	-32.2%	-90.7%	-55.7%	-0.5%	-29.0%	-19.6%
Unit MPS change due to reference price	0.8%	-3.7%	-6.4%	-57.4%	56.1%	-33.3%

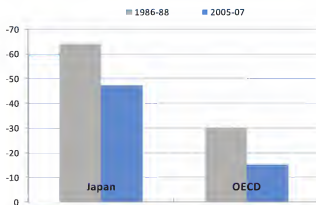
1. % change in national currency.

2. Contribution to % change is calculated if all other variables are held constant.

Source: OECD PSE database.

The Consumer Support Estimate (CSE) is the annual monetary value of gross transfers to consumers of agricultural commodities, measured at the farm gate level, arising from policy measures that support agriculture. For the most part, this is measuring the same transfer as MPS, but from the side of the consumer. When MPS results in a positive transfer to producers, it also results in a negative transfer from consumers, which is the largest component of the CSE, though it also includes direct budgetary support to consumers such as the school lunch programme for milk and rice. Since Japan's MPS exceeds the budgetary support to consumers, the CSE is negative, measuring the net burden (implicit tax) to consumers. The Percentage CSE is the share of CSE in consumption expenditure (measured at farm gate). Japan's percentage CSE changed from -64% to -47% between 1986-88 and 2005-07, implying that in 2005-07, 47% of consumers expenditure on agricultural commodities arise as a result of higher prices caused by agricultural policy.

Figure 2.6. Percentage CSE, Japan and OECD average, 1986-88 and 2005-07



Source: OECD PSE database 2008.

Overall, agricultural support in Japan is higher than the OECD average, and more focussed on market price support than is the case for the OECD average. Support is concentrated on rice production; with rice MPS accounting for one third of total MPS for the country. The level of MPS has been declining as domestic producer prices fall and

production decreases, but MPS continues to form over 85% of all support. As a result, consumers pay nearly twice the price for agricultural commodities than would be the case without support.

General support to the agricultural sector

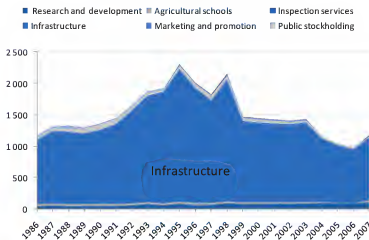
The General Services Support Estimate (GSSE) is an indicator of transfers that do not accrue to individual producers, but benefit the sector overall includes public expenditures on research and education, marketing, infrastructure or inspection services. The nominal GSSE decreased by 16% from JPY 1 267 billion in 1986-88 to JPY 1 070 billion in 2005-07 (Figure 2.7). The majority of GSSE is public expenditure on infrastructure such as irrigation and drainage, road construction, and public health and recreational facilities. The proportion of expenditure on infrastructure is in the range of 85-90% over the period. Spending for infrastructure rose significantly in the late 1990s due to the emergency programme announced in October 1994 to enhance agricultural productivity, intended to mitigate the impact of the URAA on domestic agriculture.

Expenditure on research and development increased significantly from JPY 46 billion in 1986-88 to JPY 93 billion in 2005-07. The share of research and development in GSSE rose from 3.6% in 1986-88 to 8.7% in 2005-07.

The Total Support Estimate (TSE) measures total support to the agricultural sector as a whole and is the sum of PSE, GSSE and the taxpayers cost of consumer subsidies, less import tariff receipts. Japan's percentage TSE, which is the share of TSE in GDP, was lower than the OECD average in 1986-88, but exceeds the OECD average in 2005-07. While OECD's average percentage TSE dropped from 2.5 to 1.0, Japan's percentage TSE halved from 2.4 to 1.1 between 1986-88 and 2005-07 (Figure 2.8).

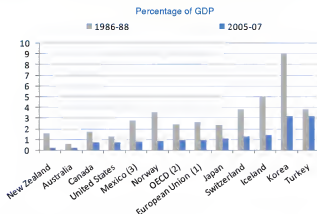
Figure 2.7. Evolution of GSSE

JPY billion



Source: OECD PSE database 2008.

Figure 2.8. Total Support Estimate by country



Countries are ranked according to 2005-07 levels.

1. EU12 for 1986-94 including ex-GDR from 1990; EU15 for 1995-2003; EU25 for 2004-06 and EU-27 from 2007.

2. Austria, Finland and Sweden are included in the OECD total for all years and in the EU from 1995. The OECD total does not include the non-OECD EU member states. TSE as a share of GDP for the OECD total in 1986-88 excludes the Czech Republic, Hungary, Poland and the Slovak Republic as GDP data is not available for this period.

3. For Mexico, 1986-88 is replaced by 1991-93.

Source: OECD, PSE/CSE database 2008.

Food security and trade policy

Food security policy

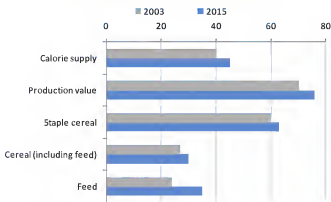
The low level of domestic agricultural production relative to consumption has led to food security becoming one of the main policy objectives for Japan's agricultural policy. The Basic Law stipulates that a stable and secure supply of food should be achieved through increasing domestic agricultural production, combined with imports and stockholding. It contains guidelines specifying the necessary food supply in the case of emergency and requires the government to set the target rate of food self-sufficiency. The target rate of food self-sufficiency is set based on goals for food consumption patterns and domestic agricultural production in the target year.

On the consumption side, the Basic Plan mandates practical "food education (Shokuiku)" that promotes consumption of domestically produced food, supports the local food movement, and ensures consumer's faith in domestic agricultural products. Westernization of the Japanese diet has led to greater intake of fat, increasing the prevalence of life-style related illnesses and increasing health care costs. To promote well-being guidelines for a desirable diet were announced in 2000 and more specific food balance guidelines in 2005. Moreover, the Basic Law on Food Education was elaborated in 2005 to help consumers acquire knowledge about food and make appropriate food choices. Under the law, the Council of Shokuiku Promotion chaired by the prime minister formulates the Basic Plan for Promotion of Food Education in order to implement comprehensive measures to promote food education. The law also encourages local governments to prepare regional promotion plans for food education. Along with food

education, consumption of rice, vegetables and fruit are promoted to encourage a rice-based “Japanese style of diet”, which is considered to have a better nutritional balance. MAFF provides subsidies to promote rice consumption such as encouraging rice menus in school lunches. These policies are expected to reduce the daily calorie supply per person to 2 480 kcal from 2 588 kcal by 2015 and reduce the proportion of fat in the calorie supply from 29% to 27% by 2015⁶.

Based on the anticipated changes in the pattern of food consumption and the quantitative target for domestic agricultural production, the target rate of food-self sufficiency is set in terms of total calorie supply, total production value and individually for each commodity. The Basic Plan projects the food self-sufficiency rate in calorie supply and production value to increase from 40% and 70% in 2003 to 45% and 76% in 2015, respectively.⁷ The self sufficiency rate for cereals is also expected to increase from 27% in 2003 to 30% in 2015 (60% to 63% excluding feed) (Figure 2.9). The expansion of feed crop production is expected to increase the self-sufficiency rate of feed from 24% in 2003 to 35% in 2015. Commodity specific target rates of self sufficiency maintain the level of rice self-sufficiency ratio at 96% (100% for table rice) in 2015 (Figure 2.10).

Figure 2.9. Target rate of food self-sufficiency



1. The target rate in production value in 2015 assumes that the level of price remains unchanged at 2003 levels

2. The target rate in staple cereals calculates the self-sufficiency rate of rice, wheat, barley and naked barley, except for feed use.

3. The target rate of feed is expressed in terms of total digestible nutrients.

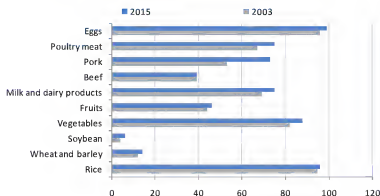
Source: Basic Plan for Food, Agriculture and Rural areas in 2005.

To increase food self-sufficiency on the supply-side, the Basic Plan aims to expand domestic agricultural production through 1) promoting agricultural production by core

6. Calorie supply is greater than calorie intake by the amount of waste in the food supply system (leftovers in restaurants, etc). See Figure 1.7 in section 1 for calorie intake data.
7. Self-sufficiency rate in production value is higher than that in calorie supply because self-sufficiency rate of high value-added and low calorie commodities such as vegetable and fruits are higher than other commodities.

farmers, 2) strengthening the partnership between agricultural producers and food industries, and 3) promoting efficient use of farmland.⁸ A quantitative target for domestic agricultural production, yield and planted area is specified by major commodity, as well as total amount of farmland and planted area. The production target in 2015 expects rice production to remain at the same level of 8.9 million tonnes. Taking into account land conversion and abandonment, the total amount of farmland is expected to decrease from 4.7 million to 4.5 million ha by 2015, but policy efforts are expected to lead to an increase in effective planted area from 4.5 million to 4.7 million ha, by increasing the use of multiple crops in a single year. With more land producing two harvests per year, the operation rate of farm land is expected to increase from 94% to 105% by 2015.

Figure 2.10. Commodity-specific target rate of self-sufficiency



Source: Basic Plan for Food, Agriculture and Rural areas in 2005.

In addition to enhancing domestic agricultural production, the Basic Plan stipulates that the government should secure stable food imports and prepare an emergency manual that identifies actions to be taken in the event of a food supply crisis. To stabilize and diversify food imports, Japan has been working with exporting countries with a view to ensuring access to supplies, for example by removing trade-restricting measures such as export restrictions and export taxes through Economic Partnership Agreements. The manual for a secure food supply in time of emergency was announced in 2002 and is reviewed every year (Table 2.6). Government-held stocks of rice, wheat, soybean and feed crops are maintained at 1 million tonnes for rice, equivalent to 1.8 months of demand of imported wheat, 31 000 tonnes for soybean (the amount equivalent to two weeks of demand), and 950 000 tonnes for feed crop (the amount equivalent to one month of demand of compound feed).

8. Core farmers are roughly defined as efficient farm operations where the farm operator earns a return to labour similar to the non-farm sector and farm enterprises that aim to be such farm operations. See Box 2.3 for more details.

Table 2.6. Emergency responses specified in the Food Security Manual

Level 0	Potential crisis to be more than Level 1	
	Information gathering and distribution Promotion of voluntary action	Utilization of stock holding and securing imports Monitoring commodity price
Level 1	Specific commodity supply is expected to be 20% less than normal supply	
	Emergency production Price control such as setting standard price	Ensuring proper distribution
Level 2	Daily calorie supply is expected to be below 2000 kcal per day	
	Conversion of agricultural production Food quota, government allocation and price control	Utilization of non-farmland to farming Priority provision of oil

Source: Food Self Sufficiency Report FY2008.

The self-sufficiency rate is determined by domestic production capacity relative to domestic demand. It was observed in section 1 that the demographic trend is for a shrinking, aging population that will consume less food over time, with the potential to improve self-sufficiency. Three simulations were carried out using the PEM to investigate the effect of changes in demand over time. These simulations cover three different scenarios. The first uses a five-year moving average to determine equilibrium consumption in 2012.⁹ The second scenario is the same as the first scenario with the added assumption that the rice diversion programme will adjust the diversion rate of paddy land in order to maintain constant prices for rice over the simulation period. This implies an increased diversion rate, reducing the quantity of paddy land relative to the trend-only scenario. The third scenario uses demand predictions from the Basic Plan instead of the trend in demand to estimate consumption levels in 2012.

Each scenario is designed to adjust demand for each commodity such that the new equilibrium level of consumption is equal to the predicted consumption level under that scenario. This is done through a shift in the domestic consumption demand curve that results in the net change in demand specified under the scenario. Demand is adjusted for those commodities that are both represented in the PEM and for which projections for demand for human consumption exist; rice, wheat, milk, and beef. For grains and oilseeds the shift in consumption demand is derived from the shift in feed-demand from livestock producers (milk and beef), and is thus endogenous.

There are some differences between the levels of demand predicted by the trend and projected in the Basic Plan. For example, the trend in beef demand is downward because of reduced consumption of beef after the BSE scare. The Basic Plan expects demand to rebound while the trend simply projects the decline in demand forward over time. The Basic Plan also is more optimistic about future rice consumption demand, reflecting policy objectives to promote rice consumption (Table 2.7).

Table 2.7. Trends in Consumption 2006-2012
Change, thousand tonnes

	Trend ¹	Basic plan
Rice	-419	10
Wheat	-134	-135
Milk	-279	130
Beef	-212	278

1. Trend is based on a five-year moving average

9. Since the model has a 2006 base year, 2012 represents a six-year ahead projection in demand.

The simulation results for the scenario where demand declines along current trends show that declining consumer demand may lead to improved self-sufficiency rates for some of the major commodities, though this impact is modest. In the case of rice, the self-sufficiency rate hardly changes despite a reduction in demand of nearly 5% (Table 2.8). This is due to rice trade policy that holds the level of imports constant over the period. Wheat production increases even as demand declines, benefiting from reduced production costs resulting from the decline in demand for factors of production in other sectors. This reduces imports by nearly 3%, increasing the self-sufficiency rate from 13% to 14%. The trend in beef demand is significantly negative, reducing imports by more than a third and increasing self-sufficiency from 44% to 54%.

Table 2.8. Estimated impact of trends in consumer demand

	Demand follows trend	Demand follows trend, PAP adjusts to maintain rice price ¹	Demand according to predictions in Basic Plan
<i>Percentage change</i>			
Rice market			
Production	- 4.90	- 4.90	0.11
Producer price	- 6.99	0.00	0.16
Imports	0.00	0.00	0.00
Self sufficiency, % pts	0.00	0.00	0.00
Wheat market			
Production	1.52	6.47	- 0.03
Producer price	- 0.01	- 0.01	0.00
Imports	- 2.73	- 3.50	- 2.51
Self sufficiency, % pts	0.01	0.01	0.00
Milk market			
Production	- 0.02	2.03	0.05
Producer price	- 0.16	- 0.32	0.08
Imports	- 6.33	- 10.13	2.86
Self sufficiency, % pts	0.01	0.03	- 0.01
Beef market			
Production	- 0.09	0.96	0.23
Producer price	- 0.23	- 0.24	0.30
Imports	- 34.45	- 35.28	45.02
Self sufficiency, % pts	0.10	0.11	- 0.09
Welfare impacts			
<i>- Change in welfare, JPY billions -</i>			
Farmers	- 97.7	- 102.05	3.36
...of which paddy rent	- 43.8	60.46	1.05
...of which other rent	1.6	- 135.88	.36
...other elements	- 55.5	- 26.63	1.95
Consumers	139.47	2.64	- 6.74
Taxpayers	- 66.7	- 71.22	70.41
Input suppliers	- 168.91	- 81.28	5.28
Total Welfare	- 213.84	- 251.91	72.31

1. PAP = Production Adjustment Programme.

Source: OECD PEM

The decline in domestic demand according to current trends leads to an estimated reduction in the domestic price of rice of nearly 7%. Modifying the production adjustment programme to maintain the price at the current level pushes land into the production of wheat and fodder crops for milk and beef. This increases their production level with respect to the “trend only” scenario and thereby increases the rate of self sufficiency in these products further. However, this policy-driven reallocation of resources leads to a decline in producer welfare above that found in the trend only scenario as efficiency losses in other land uses are greater than the increased rents to paddy land. This inverts the distribution of welfare effects in the land market, benefitting rice at the expense of other farm enterprises. The production change for rice is the same in either case — imports are constant as a matter of policy, requiring that any change in consumer demand be matched by a change in domestic production. In both scenarios, input suppliers are worse off as a result of lower derived demand for their products, and taxpayers lose some tariff revenue from the decreased gap between world and domestic prices.¹⁰

The demand trends predicted in the Basic Plan are moderately positive for rice and milk, and strongly positive for beef as demand recovers post-BSE. In the beef sector, the increase in demand stimulates domestic production, but is mostly in the form of a recovery in import demand, sending imports up by 45% and pushing the self-sufficiency rate in beef down to 35%.

Food security has long been of importance to governments. It has its roots in concerns for the risk of absolute scarcity of supplies—the quantity of food available being below the physical requirements of the population. These concerns reflect a past where conflict between nations seemed more likely, and when global trade and transport was much less fully developed than it is today. Most modern food security risk is price risk rather than quantity risk, a reduction in global supply due to climate or other factors that leads to higher prices for staple foods. Taking this view, policies lowering domestic food prices would have a positive impact on food security. For example, MAFF announced an action plan to reduce the cost of the food supply by 20% in five years mainly through reducing input costs and marketing margins in 2006. This is an example of the kind of measure that can have a positive impact on food security in terms of increasing the amount of food consumers can afford.

Actions taken on the demand side to improve food self-sufficiency are likely to be less trade distorting and may bring additional public health benefits. As well, improving the security of the supply of imports through improved trading relationships raises few concerns regarding negative side-effects. Further, policies to reduce waste in the food chain and recover food waste have the potential to improve food security and self-sufficiency in a positive way. Finally, the natural evolution of demographics on the demand side will act to improve the food self-sufficiency rate over the long term. On the other hand, there appears to be considerable overlap between food security objectives and farm income objectives in policies intended to increase domestic supply of food. As will be discussed later, policies designed to increase domestic prices and restrict trade can have negative consequences in terms of reducing efficiency and competitiveness via

10. Consumer welfare results are difficult to interpret as the shift in demand prevents an exact measure of consumer welfare change. The results shown are therefore indicative only of the effect of the change in consumer prices.

market distortions, as well as reducing opportunities to increase trade and provoking friction with trading partners.

Trade policy

Objectives related to food security have had an influence on trade policy as restricting imports can increase the share of consumption that is produced domestically. Trade policies can also be used to increase domestic prices above world prices, which can enhance the income of domestic producers (though domestic consumers must pay more than otherwise would have been the case). Border measures on agricultural products concentrate on sensitive commodities such as rice and dairy products, and these products have a high rate of self-sufficiency over 95% in the case of rice.

Following the conclusion of the Uruguay Round Agreement on Agriculture (URAA) in 1993, Japan replaced all its quantitative restrictions on imports with tariff rate quotas, with the exception of rice. For rice, a minimum access level of 4% of annual rice consumption was agreed starting in 1995 and rising to 8% by 2000. However, the quantitative restriction on rice imports was abolished and replaced by a tariff rate quota in 1999. Currently, Japan must import at least 767 000 tonnes (brown rice basis) per year, which is 7.2% of domestic consumption of rice in the base period (the rate increased gradually from 4% in 1995).¹¹ The maximum mark-up for rice imports was set at JPY 292 000 (USD 2 507) per tonne and the over-quota tariff-rate was JPY 341 000 (USD 2 928) per tonne. Over-quota rice imports have been negligible due to the prohibitive out-of-quota tariff rate.

Imports of rice are purchased and managed by the General Food Policy Bureau (GFPB) of MAFF, which has exclusive authority to import rice, wheat and barley. The majority of imported rice is sold for food processing and food aid and does not enter the domestic market for table rice. While 10% of imported rice must be sold as table rice, an equivalent amount of government-purchased domestic rice is allocated to food aid and feed to ensure that rice imports do not affect the domestic rice price or the effectively complete domestic self-sufficiency for table rice. A total of 8.3 million tonnes were imported between April 1995 and October 2007, the majority of which was imported as part of the Ordinary Market Access (OMA) part of the quota (7.5 million tonnes). The remaining part of the quota (0.8 million tonnes) is imported directly through the Simultaneous-Buy-Sell (SBS) system. In the SBS system, buyers and sellers propose a quantity of rice to be traded, an import price, and a price for purchase by the buyer. The Bureau then examines all the bids and chooses those that have the widest margin between the selling and the buying price, within a maximum specified in the URAA of JPY 292 000 (USD 2 507) per tonne. The Bureau keeps this "mark-up". The SBS system was designed to allow exporters and importers to have direct access to one another, whereas the final destination of OMA imports are handled by the government agency. While 36% and 27% of imported rice are marketed for food processing and food aid respectively, 22% of government-imported rice remains unsold and remains in stockholding.

11. In exchange for converting the rice import quota to a TRQ, the URAA permitted Japan to reduce its minimum access commitment to from the 8% quota to the 7.2% TRQ in 2000/01.

Under the URAA, Japan committed to reduce the tariff rate for agricultural goods by 36% on average (minimum 15% for each commodity) between 1995 and 2000. The average applied MFN tariff for agricultural goods between FY 1998 and FY 2006 ranges from 11.8% to 18.9% (Figure 2.11). In FY 2006, it was 17.1%, which is above the overall average of 6.5% for all goods. Non ad-valorem duties accounted for 17.4% of duties applied to agricultural goods (WTO, 2007). Tariff rate quotas apply to several agricultural products including rice, certain dairy products, prepared edible fat, dried leguminous vegetables, wheat, barley, ground nuts, tubers of konnyaku, starch and silk-worm cocoons and raw silk (Table 2.9). The in-quota tariff rate varies by commodity. Two state trading enterprises handle in-quota imports of agricultural products — rice, wheat and barley by the GFPB, and certain dairy products by ALIC. TRQs for starch, rice, barley and some dairy products are usually more than 90% filled, but TRQs for some products, including skimmed milk powder for school lunches and for feed, mineral concentrated whey, whey for infant formula and for feed, butter and butter oil for specific uses, and ground nuts continue to be under-filled (Table 2.10).

Figure 2.11. Average applied MFN tariff rate for agricultural goods, 1998-2006



Source: WTO

Table 2.9. Applied MFN tariff protection in agriculture, FY2006

HS Chapter	Description	Simple average tariff	Maximum tariff	Tariff peaks (% of lines)	Non-ad valorem tariff (% of lines)
1	Live animals	1.9	28.9	3.8	11.3
2	Meat and edible meat offal	10.6	50.0	17.0	19.6
3	Fish and crustaceans, molluscs and other aquatic invertebrates	5.5	15.0	0.0	0.0
4	Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included	77.4	544.0	87.5	63.9
5	Products of animal origin, not elsewhere specified or included	0.3	3.5	0.0	0.0
6	Live trees and other plants, bulbs, roots and the like; cut flowers and ornamental foliage	0.4	3.0	0.0	0.0
7	Edible vegetables and certain roots and tubers	28.2	810.7	5.4	8.0
8	Edible fruit and nuts; peel of citrus fruit, melons	7.8	24.0	6.4	0.0
9	Coffee, tea, maté and spices	3.5	17.0	0.0	0.0
10	Cereals	36.7	384.1	24.4	31.7
11	Products of the milling industry; malt; starches; inulin; wheat gluten	36.0	441.4	50.6	38.0
12	Oil seeds and oleaginous fruits, miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder	15.9	902.3	4.2	5.6
13	Lac, gums, resins and other vegetable saps and extracts	3.1	17.0	0.0	4.8
14	Vegetable plaiting materials; vegetable products not elsewhere specified or included	3.1	8.5	0.0	0.0
15	Animal or vegetable fats and oils and their cleavage products; prepared edible fats, animal or vegetable waxes	5.5	29.8	2.4	42.4
16	Preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates	13.4	50.0	31.0	3.0
17	Sugars and sugar confectionery	43.1	245.5	68.1	59.6
18	Cocoa and cocoa preparations	20.2	59.3	63.0	7.4
19	Preparations of cereals, flour, starch or milk; pastrycooks' products	23.4	124.9	57.6	26.5
20	Preparations of vegetables, fruit, nuts or other parts of plants	16.9	46.8	33.7	6.7
21	Miscellaneous edible preparations	23.9	308.8	49.5	16.1
22	Beverages, spirits, and vinegar	14.6	84.9	25.9	35.2
23	Residues and waste from the food industries; prepared animal fodder	1.3	22.2	2.4	9.5
24	Tobacco and manufactured tobacco substitutes	5.1	29.8	9.1	0.0
1-24	Agriculture	17.1	902.3	24.2	15.4

The WTO calculates the simple average applied MFN tariff rate of agriculture (HS1-24) in FY2006 by using 2005 AVEs, as available, provided by the Japanese authorities. A "tariff peak" is defined as three times the simple average of overall applied MFN rates.

Source: WTO.

Table 2.10. Agricultural goods subject to tariff rate quota (tonnes)

	Tariff rate quota	In-quota import (FY2004)	In-quota import (FY2005)	In-quota import (FY2006)
Skim milk powder for school lunches	7 264	2 767	2 653	2 696
Skim milk powder for other purposes	85 878	30 994	30 759	25 197
Evaporated milk	1 585	1 329	1 505	1 498
Whey and modified whey for feed	45 000	31 384	32 749	33 798
Prepared whey for infant formula	25 000	9 580	8 975	8 645
Butter and butter oil	1 873	242	173	250
Mineral concentrated whey	14 000	3 566	3 589	4 347
Prepared edible fat	18 977	18 549	18 317	18 816
Other dairy products for general use	133 940	132 362	128 303	130 703
Designated dairy products for general use	137 202	134 012	132 312	136 156
Dried leguminous vegetable	120 000	112 061	69 981	96 627
Wheat, meslin, triticale and their processed products	5 740 000	5 631 523	5 267 710	5 479 033
Barley and related processed products	1 369 000	1 433 068	1 449 276	1 523 030
Rice and related worked and/or prepared products	682 200	678 885	679 511	679 252
Starched, inulin and preparation of starches	157 000	158 674	136 264	165 126
Ground nuts	75 000	40 246	40 266	43 497
Tubers of konnyaku	267	86	51	60
Silk-worm cocoons and raw silk	798	43	7	6

Source : WTO.

Provisional safeguard measures were activated for Welsh onion, shiitake mushrooms and tatami-omote in 2001 due to a surge in imports of these products of which China was the main exporter. Special safeguard actions are taken for a number of products in accordance with the WTO Agricultural Agreement. Emergency safeguard measures are triggered by import spikes and were applied on pork and beef imports (pork in FY 2001, FY2002 and FY2003 and beef in FY2003). The emergency measures allowed the gate price for pork and tariff rate for beef to rise to the WTO bound level. SPS measures were also taken related to the emergence of BSE in some exporting countries since 2001.

Japan began to actively pursue bilateral or regional Economic Partnership Agreements (EPAs) after 2000. The first agreement was signed with Singapore in 2002 and the second with Mexico in 2004; the latter was the first agreement in which agricultural products were included. Between 2005 and March 2009, Japan signed EPAs with the Philippines, Thailand, Malaysia, Indonesia, Brunei, Chile, ASEAN and Switzerland. These EPAs will eliminate or reduce tariffs, or introduce preferential tariff-quotas for several sensitive agricultural products such as poultry meat and fruit. Japan is now negotiating EPAs with Korea, the Cooperation Council for the Arab States of the Gulf (GCC), Vietnam, India and Australia. The government expects to increase the number of outstanding agreements to 12 agreements by early 2009.

The level of agricultural exports has remained low relative to its agricultural imports. However, rapid economic development in other Asian countries has led to increases in the export of agricultural, forestry and fishery products by 36% between 2000 and 2006. This increase is particularly noteworthy in the case of the export of specialty products including fishery products, fresh fruits and green tea. In March 2005, an export promotion plan was put in place, which aims to double the value of exports to JPY 600 billion by 2009. The yearly policy plan in 2007 under the Basic Plan for Food, Agriculture and

Rural areas sets even more ambitious goals to increase the value of exports to JPY 1 000 billion by 2013 through accelerating quarantine negotiation with importing countries and overseas marketing.

In 2006, MAFF elaborated the East Asia Food Industry Union Plan in 2006 to promote expansion into East Asian markets by providing regulatory and market information for investors, sharing information between stakeholders and promoting Japanese food overseas. MAFF aims to increase sales into East Asia from USD 8.4 to 11.0-12.5 billion between 2007 and 2012. Japanese firms often process food in East Asia — particularly in China — for import to Japan because of the lower tariff rate on processed food and lower labour costs. However, 76% of sales by these offshore processors were made in the local market and only 15% from exporting back to Japan.

Food safety and consumer protection policy

Since January 2001, Japan has suspended imports of beef, beef offal and products thereof from the EU member countries, Switzerland and Liechtenstein where BSE cases were identified. In September 2001, the first case of BSE in domestic cattle was reported in Japan. In May 2003, a case of BSE infection was confirmed in Canada for the first time. Japan immediately suspended imports of Canadian beef and related products. In December 2003, BSE was also confirmed in the US, the largest beef exporter to Japan, and imports of US beef and related products were also suspended. After a two-year suspension, and following risk assessments by the FSC, imports of US beef and beef products were resumed in December 2005 on condition of compliance with the Export Programme agreed between the US and Japan. Imports from Canada were also resumed in 2005 under similar conditions. However, beef imports from US were suspended again from January to July 2006 due to non-compliance of beef exporting enterprises in the US. Japan has also banned poultry imports from many countries since January 2004 because of the outbreak of avian influenza. The BSE crisis, both domestically and in countries supplying imports, triggered the reform of food safety policy. Weaknesses in the management of BSE issues in the areas of risk management, balancing producer and consumer interests and cooperation between departments resulted in the establishment of basic principles of food safety policy and government reorganization. The Food Safety Basic Law was implemented in July 2003 to establish the basic principles of food safety policy and put in place a Food Safety Commission (FSC) to perform independent risk assessments. The FSC has three primary goals: conducting risk assessments of food in a scientific, independent, and fair manner and making recommendations to relevant ministries based upon the results, implementing risk communication among stakeholders and responding to food-borne accidents and emergencies. Moreover, a Beef Traceability System was developed whereby MAFF allocates an identification number to all cattle. This identification is transmitted through the retail chain so that consumers can identify the original cattle for all domestic dressed meat in shops and certain restaurants.

Some of Japan's SPS measures have led to trade disputes with its trading partners and two challenges before the WTO's dispute settlement system. In 1997 the United States requested the WTO dispute settlement body to set up a panel on Japan's varietal testing requirement for eight agricultural products including apricots, cherries, plums, pears, quinces, peaches, apples and walnuts which were considered by Japan to be hosts for the codling moth. The WTO concluded that Japan's varietal testing requirements are not consistent with the requirements of the SPS agreement due to the lack of scientific evidence. Following the WTO's ruling, Japan abolished the varietal testing requirements

for the eight agricultural products in 1999. The United States brought Japan's quarantine requirement on apple imports for fire blight to a WTO's dispute settlement panel when the bilateral negotiations had failed to find a solution. The panel's decision in 2003 was that Japan's quarantine requirement for fire blight lacks scientific evidence and is inconsistent with the SPS agreement. As a result, Japan revised its quarantine protocol on apple.

The Food Sanitation Law, one of the main sanitary and phyto-sanitary regulations together with the Plant and Animal Quarantine regulation, was revised in 2003 to introduce a positive list system for chemicals in foods, in which the maximum residue limits for agricultural chemicals (*e.g.* pesticides, feed additives, and veterinary drugs) are set for each category of food. The positive list system came into effect in May 2006.

The Food labelling policy has been strengthened in recent years. The Food Sanitation Law and the Law Concerning Standardization and Proper Labelling of Agricultural, Forestry and Fishery products (JAS law) provide the major regulatory framework for food labelling with an objective to ensure food safety and help consumer's choice, respectively (Box 2.3).

Box 2.3. Evolution of food labelling policy

Since 2001, the Food Sanitation law requires safety assessment and labelling for Genetically Modified Foods. The labelling of five allergenic food materials (egg, milk, wheat, buckwheat and peanut) is also required by the Food Sanitation Law since 2001. Place-of-origin labelling became mandatory in 2000 for fresh foods, indicating the original prefecture and country for domestic and imported products, respectively. The JAS law also requires the labelling of processed foods (*e.g.* raw materials and processed country for imported foods) since 2001. The JAS law also introduced place-of-origin labelling of raw materials (more than half of the weight) for certain processed foods in 2001 and widened its scope in 2004 to 20 categories of processed foods which covers most lightly processed foods. The JAS standard for organic foods was established according to the Codex guideline for the Production, Processing, Labelling and Marketing of Organically Produced Foods in 2000, requiring producers to be certified by a registered certifying body to label their products as organic.

Rice policy

Many of the objectives of agricultural policy — food security, farm income, multifunctionality — find their focus in the production of rice. Rice production, and to a lesser extent other field crops, receives the greatest amount of policy support, as well as many other government interventions that influence how and where rice is produced. Rice is the staple food of the Japanese and the nature of paddy land leads to most of the multifunctionality concerns that have been raised, such as water buffering and cultural landscape. This section looks at the policies and issues facing the rice sector, starting from the most controversial rice sector, followed by other commodities. The two sections that follow this one expand the scope to consider policies directed at other field crops, as well as an analysis of the land market. The land market in particular is influenced by the same objectives that shape rice policy, and how well it functions will determine the sector's capacity to adjust over time.

Recent policy reforms in rice sector

For most of the last 50 years, marketing of rice was under direct government control. The Rice Marketing Control Regime, based on the Food Control Law (FCL), contained

various policy measures such as marketing licenses, state trading and price setting procedures to stabilize both production and the consumer price of rice. FCL required rice producers to sell rice to the government at a set price based on estimated production cost. Since the government estimated the labour cost in rice production based on the non-farm wage rate, the rapid development of the non-farm sector led to a continuous increase in the producer price of rice, resulting in over-production. Meanwhile, the consumer price of rice was set significantly lower than the producer price. Government payments had to bridge this price gap, and the pressure on the budget became unsustainable by the late 1960's. In response, the production adjustment programme was introduced in 1971, in which the government allocated to each farmer an amount of land to be diverted from rice and provided subsidies according to the diverted area. This in effect controls production by controlling planted area.

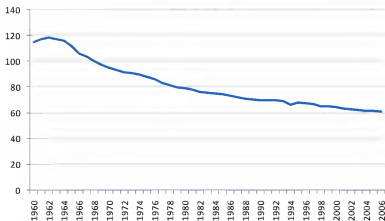
Per-capita consumption of rice began to decline by the 1960s. Consumption per person peaked in 1962 at 118 kg per year and has decreased by almost half to 61 kg in 2006 (Figure 2.12). The downward trend in rice consumption required an increasing amount of land to be diverted from rice production under the production adjustment programme in order to track declining consumer demand and clear the domestic market at a price higher than would be the case otherwise. The level of production was highest in 1967 at 14.5 million tonnes, but it declined to 9.1 million tonnes in 2006 (Figure 2.13). Diverted paddy area, 257 000 ha (8% of total paddy area) in 1971 increased to 710 000 ha (30% of total paddy area) by 2006 (Figure 2.14).¹² In 2006, commodities other than rice were planted on 61% of the diverted paddy area and the rest of the paddy area was left idle during the summer.¹² The paddy infrastructure for diverted land is maintained. Diverted land is usually rotated every year in the community. It is estimated that 13% of rice producers, mostly small size farmers, did not participate in the production adjustment programme in crop year 2006, accounting for 15% of area planted.

Following a significant crop failure and the conclusion of the URAA in 1993, direct intervention in the rice market was gradually reduced. In 1995, FCL was transformed into the Staple Food Law (SFL), which reduced the role of government to stockholding and deregulated the marketing of rice. Although the production adjustment policy had begun as a budgetary measure, SFL stipulated that production adjustment be used as a tool to balance the supply and demand of rice, which provided legal status to the production adjustment policy. Rice marketing was partly liberalized with the introduction of a planned marketing chain composed of registered intermediaries in which producers would voluntarily participate. Direct government purchases in this system were limited to those made for stockpiling. SFL required the price of rice sold through this marketing system be formed through tenders in the Rice Price Formation Centre to reflect market demand, though a price boundary was set to avoid volatile price fluctuations. Producers were also free to market directly to consumers, and the share of rice marketed outside of the planned system grew significantly over time.

12. On the paddy diverted to other crops, wheat and barley (25%), feed and fertilizer crop (24%), vegetable (22%) and soybean (18%) were planted in 2006.

Figure 2.12. Per capita rice consumption, 1960-2006

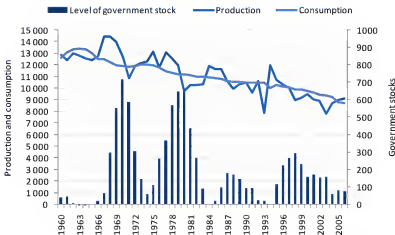
Kg per year



Source: MAFF.

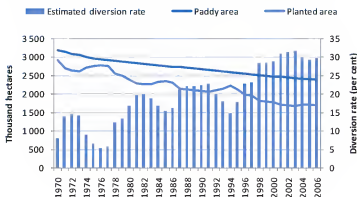
Figure 2.13. Rice production, consumption and public stocks

Thousand tonnes



Source: MAFF.

Figure 2.14. Paddy area and planted area of rice, 1970–2006



Source: Farmland and planted area survey, MAFF.

In 1998, an operational rule of rice stockpiling was announced linking the purchasing and selling quantity in order to maintain a stock of one million tonnes. The price boundary for tenders in the Rice Price Formation Centre was abolished to allow more flexible price adjustment. As a part of a shift from price-based policy to income policy, the Rice Farming Income Stabilisation Programme (JRIS) was also introduced in 1998. JRIS compensates rice producers who participate in the planned marketing system for part of the loss of income when farm receipts falls below the standard income that is calculated as the average farm receipts of the three preceding years. Eligible producers have to fulfil the required diversion target of the year, enter into a contract with an agricultural co-operative and deposit a certain amount of money as a "limited withdrawal deposit" with the co-operatives. The JRIS programme was revised in 2004 and the Core Farmer Management Support Programme (CFMS) was added to compensate the revenue loss exclusively for those core farmers who meet specific criteria (Box 2.4).

The Principles of Rice Policy Reform were announced in 2001 with the aim of improving the market orientation of policies. The basic concept of this reform, which is to be completed by 2010, is to improve the production structure by promoting efficient and stable rice farms that are more competitive and better able to respond to market signals. One of the major elements of this reform is the revision of the production adjustment policy, to be implemented in two stages. The first stage of the reform was implemented in 2004, in which the production quota was allocated to each region based on the sales record of two preceding years, instead of specifying the area of diversion for each producer individually. The second stage of the reform, started in 2007, allows farmers and farmer organizations to decide the distribution of the production quota. The role of government is foreseen to be limited to the provision of supply-demand information and to approve the production adjustment plan prepared by the producer organizations. Currently, MAFF allocates the production quota to each prefecture according to the preceding four out of six years record of sales excluding the highest and lowest years.

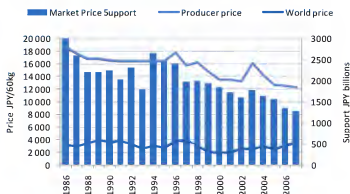
In order to provide an economic incentive to participate in the production adjustment program, MAFF provides subsidies to the producer's organisations that participate in the production adjustment programme. Specifically, the diversion payment is allocated to the regional paddy farming associations according to the production quota. The regional associations are established at the level of the local municipality and prepare a regional paddy farming "vision" containing the future use plan of paddy field, the target level of planting and sales, and the specific usage of the diversion payment. In particular, the regional vision clarifies the list of core farmers based on consensus between community members with the goal of allocating more resources to selected core farmers. In the previous scheme, a fixed amount of subsidy was paid to each farmer based on the diverted area of paddy. The new subsidies are paid to the regional associations who then allocate the diversion and subsidy among their members more flexibly. Regional associations are encouraged to distribute diversion payments to accelerate structural change voluntarily. For example, the regional association in Chikusei city in Ibaraki prefecture succeeded in concentrating paddy use to core farmers (713 ha in 2003 to 1 365 ha in 2006) by allocating additional subsidy to core farmers and to land owners who rent out their land to core farmers. The proportion of producer organizations that allocate diversion payments focusing on core farmers increased from 59% to 83% between 2004 and 2007. In addition, the government provides short-term loans and subsidies for those who ship their crop separately to stockholding in good crop years. The amount of diversion using the production adjustment programme is calculated using a yield assumption which will be different from actual yield in any given year. Higher-than-anticipated production would have a negative impact on domestic prices if it were all allowed into the domestic market and the loans to ship to stockholding act as a buffer on supply in good years. The planned marketing system of rice was also abolished in 2004, further liberalising rice marketing.

Following a further fall in the rice price, MAFF announced emergency rice measures in October 2007, including government purchases of 340 000 tonnes rice to increase the level of stockholding to one million tonnes in line with the preannounced operational rule and a subsidy to allocate 100 000 tonnes of rice to animal feed. The production adjustment programme was also revised so that prefectures can effectively trade production quotas. Under this scheme MAFF reallocates the production quotas in response to requests by prefectures. In return, prefectures that reduce production receive increased diversion payments while prefectures that increase production see reduced payments. Moreover, extra diversion payments are allocated to those entering into long-term contracts with regional associations to conduct additional diversion.

Evolution of support to rice

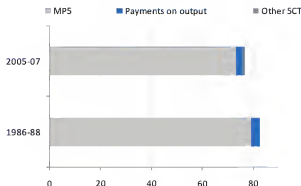
According to the OECD PSE database, the producer price of rice declined by almost one-third between 1986-88 and 2005-07. The fall in both producer price and the amount of production led to a decline in the rice MPS by 47% between 1986-88 and 2005-07 (Figure 2.15). Most of the decline in rice MPS is due to changes in the producer price rather than the decline in production quantity. Despite this decline, the share of SCT in farm receipts (%SCT) declined only slightly from 83% to 77% and MPS continue to compose around 95% of the SCT for rice (Figure 2.16).

Figure 2.15. Rice price and market price support, 1986-2006



Source: OECD PSE database 2008.

Figure 2.16. %SCT for rice



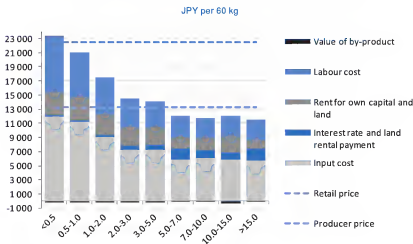
Source: OECD PSE database 2008.

Structural issues in rice farming

One of the most important characteristics of rice production in Japan is the predominance of small-scale side-business farm households. Approximately 65% of rice farms cultivate plots less than one hectare in size. While business farm households produce more than 90% of vegetables and livestock, they produce only 38% of rice. Despite various policy efforts and the mechanization of rice farming that creates economies of scale, the average farm size expanded by only 70% between 1960 and

2005. The production cost data for farms outside Hokkaido indicate a significant cost advantage for larger farms (Figure 2.17). The total production cost for farm operators who cultivate less than a half hectare is more than double of those cultivating more than 15 ha. Moreover, the total production cost for those that cultivate less than 5 ha of paddy exceeds the average producer price, implying a negative profit for small-scale rice farms. The total production cost even exceeds the retail price of rice for the smallest farms.

Figure 2.17. Production Cost of Rice by Farm Size (Non-Hokkaido)



Source: Rice Production Cost Survey crop year 2005, MAFF.

Promoting structural adjustment leading to a sector dominated by more efficient large-scale operations is considered as one of the most important policy goals in rice policy. This goal is motivated by the view that the low productivity and high input intensity of small-scale rice farming are not sustainable from the point of view of either efficiency or environment. Policy efforts to promote structural adjustment include identifying local core farmers and the reorientation of the JRIS programme to the CFMS programme to compensate a larger proportion (90% compared to 80% in JRIS program) of income loss for large-scale certified farmers and community-based farm co-operatives than for other farmers. The CFMS programme is now integrated with the direct payments for core farmers that cover five other commodities, but the eligibility for payment remains the same — it is directed to large-scale farm operators. In addition, diversion payments are allocated so that extra funding is provided to regional councils that have a higher proportion of core farmers, allowing extra payments to be provided (Box 2.4).

Box 2.4. What is a core farmer?

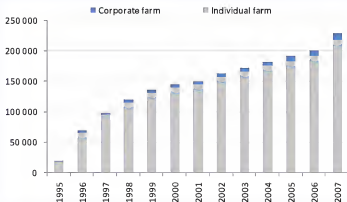
The Basic Law stipulates that measures should be taken to promote efficient and stable farms (whose farm income is comparable to the non-farm sector with equivalent working time) and improve the structure of agricultural production by increasing the proportion of such farms. In principle, if markets function well, market adjustment should lead to an agricultural structure dominated by efficient farms. However, adjustment has been relatively slow in Japan for a number of reasons having to do both with policies and other factors. As a result, policy support is being concentrated on core farmers (*Ninaite*), defined as a farm management unit which is already or is aiming to be an efficient and stable farm. Two basic criteria are currently used to identify farmers as core farmers—certified farmers and certain types of community farming.

Certified farmers

The certified farmer scheme was launched in 1993 based on the Agricultural Management Basis Improvement Law (AMBIL), with an aim to identify core farmers and concentrate policy support on such farms. This scheme requires local municipalities to have a ten-year plan to promote efficient and stable farm management, including target farm size, income, family labour input and technological development, following the basic principles prepared by each prefecture. Individual farmers or corporate farms who prepare a five-year farm management improvement plan including target farm size, rationalization of agricultural production and farm management can apply for approval by the local municipality. The local municipality approves the farmer's plan based on its compatibility with the local basic plan, likelihood of success and its efficiency of farmland use.

Certified farmers benefit from a number of support programs such as preferential lending and taxation, and certain land improvement and consolidation programs. Certification is also required to receive the newly-introduced direct payments for core farmers. As a result, the number of certified farmers has been increasing every year, from 19 000 in 1995 to 229 000 in 2007 (see figure below). More than 95% of certified farmers are individual farmers. Certified farms account for approximately one third of total land cultivated in 2007. Associations to support core farmers, established in 2005 by national and regional agriculture related organizations, announced an action plan to increase the number of certified farmers to about 300 000 by the end of 2009 through training and regional activities designed to assist potential certified farmers.

Number of certified farmers, 1995-2007

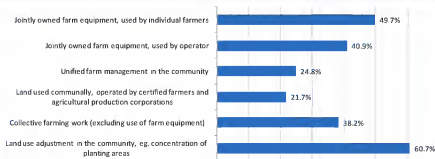


Source: MAFF.

continued

Community-based farm co-operatives

Community-based farm co-operatives are farming units in which farmers in a rural community jointly manage agricultural production through a co-operative agreement. Community farming can take many forms, from simply sharing farm equipment to unified farm management as a corporation. The motivation to form community farming varies depending on the region, but emerged typically in the absence of individual core farmers in the community. In these cases, the aging of farm population and lack of core farmers makes agricultural production unsustainable without collective farming. A MAFF survey in 2008 showed that currently 12 095 community-based farming co-operatives exist and on average are composed of 40.5 farm households and cultivate 26.4 ha of land. It is estimated that approximately 7% of total farmland is cultivated by such community farming units. The same survey showed that 60.7% of community based farm co-operatives coordinate land use in the community and 49.7% of them jointly own farm machinery used by the individual farmers. The proportion of community based farm co-operatives that unify community farm management was 24.8%.

Activity by community farming unit

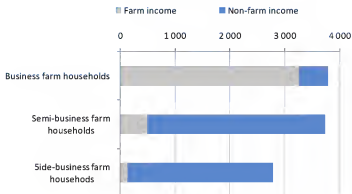
Source: MAFF.

The main benefit of community farming is often cost reduction. Since small farms tend to own farm equipment that is not fully utilized, joint ownership of farm machines can reduce the fixed cost of machinery. Moreover, consolidation of land area can save labour. Community based farm co-operatives that function as unified farm management units are considered to be equivalent to core farmers to complement the certified farmer programme. In order to promote such community farming, community based farm co-operatives that cultivate more than 20 ha are eligible for the new direct payments for core farmers. Eligible community based farm cooperative must aim to consolidate more than two-thirds of the land in the community, have written rules of association, unify financial accounts, set a target income for participating farmers and have a plan to become an Agricultural Production Corporation.

A common explanation for the continued presence of high-cost small farms is the very low dependence on farm income of small scale rice farms. The 2005 census data indicate that while 70% of income for business-farm households comes from farming, side-business farms earn only 3% of their income from farming (Figure 2.18). In other words, when farm income is small, it is also relatively unimportant in household income. As the cost data imply, rice farm households cultivating less than one hectare of land have negative farm income from rice farming (Figure 2.19).

Figure 2.18. Composition of income by types of rice farms (2006)

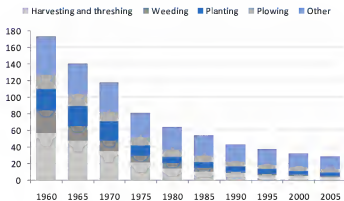
JPY thousand



Source: MAFF.

Figure 2.19. Farm Income from rice farming by farm size (2006)

JPY thousand (left axis), Per cent (right axis)



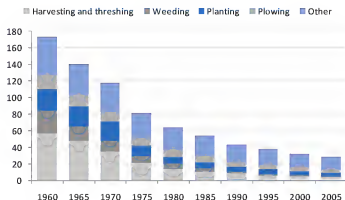
Source: MAFF.

The fact that smaller farms have a small share of farm income in total household income does not by itself provide a sound economic rationale for small-scale rice farms to remain in the sector. It is unlikely that such a large proportion of farm households continue rice farming for the reasons that have been put forward, such as hobby farming or to maintain family plots. While some small farms may produce at a loss for their own consumption or to give rice as a gift to relatives, the lower opportunity cost of farming for small-scale side-business farms is likely an important part of the decision to continue producing rice.¹³

Mechanization of rice farming enabled full-time rice farmers to save labour cost and expand farm size, but, at the same time, it also helped part-time farmers to save labour time and engage in off-farm employment (Figure 2.20). The collective services provided by local agricultural cooperatives in various stages of rice farming such as seedling, processing and marketing also reduces the labour time required of small farmers. In addition, it is widely observed that part-time farmer contracts out major farm works to business farmers or farming service enterprises on a commercial basis. Together with the improvement of transportation infrastructure in rural areas, these conditions enabled small-scale rice farmers to engage in full-time non-farm employment and continue rice farming at the same time (Figure 2.21). Agricultural cooperatives also help small farms overcome the disadvantages of being small (Box 2.5).

Figure 2.20 Labour input by rice farms, 1960-2005

Hours per 0.1 hectare



Source: Rice Production Cost Survey, MAFF.

13. Producers' own consumption and giving of rice account for approximately 15% of rice consumption in 2005.

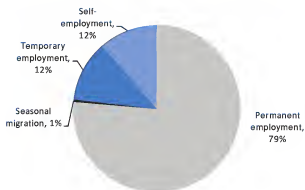
Box 2.5. Agricultural co-operatives in Japan

Agricultural co-operatives (Nokyo) in Japan are established as co-operative organizations aiming to facilitate co-operation between members. Membership is voluntary and each member enjoys equal voting rights. Co-operative organizations are established to help small-scale enterprises compete with larger enterprises and as such are exempted from the regulations of the Antimonopoly Act unless they engage in unfair trading practices or otherwise seek to limit competition. Limitations on distributing earnings to members are also in place to reduce the potential to abuse market power.

Although membership is voluntary, almost all farmers in Japan are members of agricultural co-operatives (JA). Formal membership is limited to farmers (usually for those cultivate more than 0.1 ha of land and engage in more than 90 days of farming), but non-farmers can be associate members by paying the membership fee. In March 2005, JA had 5 million formal members and 4.2 million associate members. The proportion of associate member is increasing in recent years as the number of farmer decreases. Regional JAs also form national and prefectural level associations in each business area to complement the JA's activities. In order to rationalize the management and improve financial solvency of JAs, MAFF promotes the merger of JAs, which led the number of JA to decrease from 2501 to 810 between 1995 and 2007. A majority of prefectural level associations are also merged to regional JA or national association.

JA provides four major services to its member, namely 1) farming and marketing support such as supply of farm inputs, sales of member's output and farm management assistance, 2) financial services such as credit or deposit-taking, 3) insurance services including life insurance, fire insurance and car insurance and 4) welfare services such as medical and home nursing. Each JA usually has farm advisors (14 000 in 2006) to provide technical support to farming and marketing. The majority of JA own collective use facilities such as rice mills, rice storage and rice nursery beds to help members benefit from economies of scale. Approximately 20% of JA engage in contract farming with their member farmers. JA have a large market share in major domestic agricultural products (50% in rice, 54% in vegetable and 63% in beef) and in input markets (90% in chemical fertilizer, 60% in pesticides and 55% in farm machinery). However, the majority of business profits come from credit and insurance service (55% of business profit in 2006), helping to support loss-making parts of their businesses. Following the ministerial order to improve their operation in 2005, JA groups accelerated the reform of their marketing and input supply services, improving their governance structure, downsizing and reducing marketing margins and commission for input supply. In 2007, the Japan Fair Trade Commission took the step of clarifying specific cases where Anti-monopoly regulation can be applied to the conduct of agricultural co-operatives (e.g. allowing the use of collective facilities on the condition of purchasing inputs).

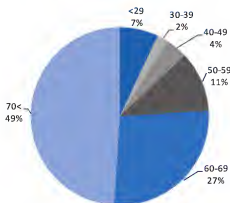
Figure 2.21. Off-farm employment of part-time farmers



Source: 2005 Agricultural Census, MAFF.

If the farmer who has full-time non-farm employment needs to engage in farming only during the weekend, perhaps assisted by other elder family members who take care of small day to day tasks, the opportunity cost of engaging in rice farming is not more than the value of weekend leisure time. In contrast, farmers who engage in full-time farming but could have earned non-farm income during weekdays have an opportunity cost of farm labour time equivalent to the non-farm wage rate. The aging of rice farmers also lowers the opportunity cost of rice farming because off-farm employment is not a realistic option for older farmers. In 2007, approximately half of those who produce only rice were more than 70 years old and 76% of the farmers were over 60 years old (Figure 2.22).

Figure 2.22. Age of rice farmers, 2005



Data for rice farms producing only rice.

Source: MAFF.

Since the labour cost in surveys of costs in rice production is estimated using the wage rate in small size non-farm enterprises (average wage rate in construction, manufacturing and transportation industries that hires 5 to 29 employees in each prefecture), the labour cost for side-business farms in official data is likely overestimated, leading to the conclusion that small-scale rice farms produce at higher cost than producer price. In fact, the lower opportunity cost of labour enables side-business rice farms to make a positive profit and continue rice farming. The question of whether small-scale rice farms operate on an economic basis is important in determining whether these producers are likely to respond to changes in the price of rice. In particular, policies that raise the price of rice and that are primarily directed at larger-scale producers for whose income the rice price is important. These policies may also have the effect of maintaining the small-scale producers who compete with larger producers for land, as well as in the market for rice.

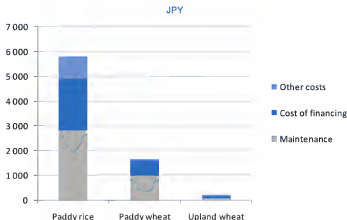
Rice pricing policy and production adjustment programme

The production adjustment programme has three important effects. First, it is the policy tool that allows the domestic price to remain above what the market-clearing price would be without diversion of some rice production. While there is no official price target, the level of diversion is chosen based on demand projections, considering the trends in rice consumption, in order to match the quantity supplied to the market with the quantity demanded. Nevertheless, it is clear that the level of demand is contingent on the price, and by restricting the supply of rice into the market, the price is maintained at a higher level than would otherwise be the case. Second, the programme allows rice production to be distributed widely in Japan, including in less favoured areas by sharing the amount of rice diversion over different areas. The higher domestic price that results from supply diversion makes production economic in more areas, and the diversion is shared among efficient and less efficient areas by allocating the quantitative production target to each prefecture. Third, the production adjustment programme maintains a higher capacity for rice production in terms of maintained paddy area than is practically required for domestic needs. The increase in diverted area has resulted in approximately half of paddy land being improved to be able to plant crops other than rice. However, maintaining land as paddy has an adverse impact on the cost structure, as costly infrastructure maintenance is performed on more land than is required and on more than would be the case in the absence of the programme (Figure 2.23).¹⁴ Not only is the infrastructure cost higher than necessary when crops other than rice are grown on paddy land, the diversion programme does not allow the market to select for more efficient producers, further increasing the average cost of production. Recently, the reforms made to the rice production adjustment programme are a step forward in allowing more efficient producers to have a greater share in production, but it remains to be seen if these reforms will have a significant impact. These reforms do not address the problem of sustained over-investment in maintaining paddy fields in excess of production requirements.

Together, the border protection provided by the tariff rate quota for rice and the high domestic price supported by the production adjustment (and related) programmes account for a large portion of the calculated MPS for Japan. MPS is typically considered a trade issue, but it is clear that much progress could be made in reducing the level of MPS in Japan by further deregulating the domestic market. The tariff disconnects the domestic price from the world price and enables policies such as the production adjustment programme. The current TRQ by itself is sufficient to ensure domestic self-sufficiency in rice by limiting imports, but the production adjustment programme also plays a role in the premium of domestic over world price.

14. Converting paddy land to upland may not reduce the maintenance cost as shown in this figure since it usually requires additional investment to improve drainage and the cost of financing previous investment in paddy land may not be fully written-down.

Figure 2.23. Maintenance cost of paddy and upland per 0.1 ha



Source: Rice and Wheat Production Cost Survey crop year 2005.

A scenario investigating the role of the production adjustment programme in price formation in the domestic rice market was carried out using the PEM. MAFF has estimated the amount of land that would return to production of rice in the absence of the programme at about 330 000 ha (land currently diverted under the program is greater than this amount).¹⁵ This amount is taken as the “effective” diversion rate of the program and the model is calibrated such that, other things being equal, removing the constraint on land imposed by the program in the model results in an increase in the amount of paddy land producing rice of this amount. Eliminating rice diversion acts to increase the supply of paddy land for rice and reduce the supply of land for other uses by the same amount.¹⁶ The effect of this increase in supply of land in the rice market depends on the demand elasticity and how important land is as a share of total production costs—the larger this share, the greater the shift in the supply of rice for a given shift in the supply of land. The elasticity of demand is also important, as it indicates the change in domestic price for a given shift in the supply of rice.

The results indicate that, depending on the assumptions regarding the demand elasticity and the importance of land in production costs, the production adjustment programme leads to a domestic price between 5 and 18% higher than would otherwise be the case (Table 2.11). The policy shock used in these simulations is the relaxation of the constraint on land use choice imposed by the production adjustment programme. Alternative scenarios consider the case where the share of land costs in the total production cost is higher or lower, and whether the elasticity of demand is highly or moderately inelastic.

15. Room Documents No.5 submitted by MAFF to 5th Meeting of Planning Working Group, Study Group of Production Adjustment in 2002 (in Japanese).

16. Annex 1 contains a more detailed discussion of the representation of this policy in PEM.

The quantity of paddy land increases by 330 000 ha, or about 20%, from the elimination of rice diversion. Under the different scenarios this change leads to modest production increases of between less than 1 and 7%. Increased supply of paddy land lowers its price and leads to less intensive production as land is substituted for other purchased inputs. The increase in rice production is smaller than the increase in paddy land in percentage terms because of less intensive production. In all cases, consumers benefit from the lower price and greater supply of rice in the domestic market. Under the assumption of a high share of land in total cost farmers are worse off from the reform, but better off if land costs are low. The reason for this is that the production adjustment programme generates rents in the paddy land market. If land is an important component of total cost then this rent plays a greater role in determining total farmer welfare. When demand for rice is not too inelastic, the resulting increase in production leads to a higher marginal value of labour for the farmer, as measured by the price of the “farm-owned” factor in the model¹⁷

Table 2.11. Estimated impact of production adjustment programme on production and price

	Initial values	Using base parameters of model	High land cost, base demand elasticity	Base land cost, low demand elasticity	High land cost, low demand elasticity
~ Percentage change ~					
Output market for rice					
Production	8.56	3.00	6.79	.87	2.19
Producer price	218.75	- 4.66	- 10.06	- 7.47	- 17.68
Factor markets					
Paddy land (million hectares) ¹	1.69	19.55	19.55	19.55	19.55
Paddy land rental rate		- 24.61	- 24.05	- 28.44	- 33.80
Farmer's return on labour ²		1.71	3.94	- 1.91	- 4.62
Welfare impacts					
~ Change in welfare, JPY Billions ~					
Farmers		38.26	- 176.34	4.18	- 259.76
Consumers		94.51	207.90	150.22	357.99
Taxpayers		13.61	- 5.85	12.00	- 11.02
Input suppliers		- 4.71	- 4.67	- 14.11	- 28.17
Total Change		141.68	21.05	152.29	59.04

1. Change in paddy land area is fixed at 330 000 ha by scenario design.

2. Farmer's labour return is measured in the model as price of farm owned capital — the vast majority of which is own labour, such that this price is roughly equal to the implicit wage rate for the farmer's labour.

Source: OECD PEM.

17. Farm welfare is defined as the sum of producer surplus for all farm-owned factors, including land, own-labour, and other capital assets. Changes in farm welfare will not be the same as changes in the marginal value product of labour, and need not even have the same sign.

A high rice price has been considered necessary to maintain the farm income of business farms that largely depend on rice for their income. However, the effect of the production adjustment programme on price (depending on assumptions) is estimated to be small to moderate relative to the size of the programme in terms of diverted area. The simulation results indicate that reducing the area of paddy land diverted to other crops lowers the paddy land rental rate and can increase the return to labour, both of which can be positive forces for increasing farm size. If farm income is the policy objective, there are more transfer-efficient and effective means of providing income support that also have the virtue of being more readily targetable to business farms. In fact, the policy simulation that partially replaces the market price support derived from the production adjustment policy with direct payment (Table 2.4) shows the positive effects on producer welfare as well as the consumer welfare. On the other hand, high rice prices also benefit small-scale side-business farms that compete with business farms both for land and in the market for rice. That these small farms are often willing to accept a lower return on their labour than business firms may explain in part the discrepancy between returns to labour in the farm vs. the non-farm sector. While there are impediments to competition that keep the productivity of labour in agriculture below that of other sectors, namely imperfections in the land market, high rice prices also likely play a role in sustaining the productivity gap.

As said earlier, the production adjustment programme enables more widespread production throughout the country and especially in less-favoured areas and near-urban areas where the opportunity cost of land in agriculture is very high. It also preserves a high percentage of agricultural land as paddy land. These aspects of the programme complicate reform, as the maintenance of agricultural land both in less favoured areas and near urban areas are important policy goals. Recently a more targeted approach has been introduced in the form of a direct payment to less favoured areas. This approach is likely to be more cost-efficient and effective at preserving agriculture in these areas, without the costly distortions of agricultural markets caused by price-based approaches. It is also more likely to be sustainable given the forecasted demographically-driven decline in rice consumption that is already putting significant pressure on the production adjustment programme.

Maintenance of paddy land is an objective of Japanese agricultural policy for its water-buffering properties to control flooding on sloped land as well as for the preservation of traditional landscapes. Without the production adjustment program, it is likely that a significant portion of paddy land would be converted into upland uses, or to non-agricultural use.¹⁸ However, maintaining the land as paddy land imposes infrastructure and maintenance costs on producers that increase their fixed costs, government support to this infrastructure cost notwithstanding. The high infrastructure and maintenance costs as well as technical difficulty in drainage for paddy limit the flexibility of crop choice by farmers. These costs may also function as a lower boundary for land rent, making it difficult for other farmers to rent in. A more targeted approach to maintaining the paddy landscape in environmentally sensitive or areas of particular significance would help the sector to rationalise its cost structure by eliminating excess fixed capital and reducing maintenance costs.

18. MAFF estimated in 2002 that 43% (0.33 million ha out of 0.97 million ha) of paddy under diversion programme would return to rice production in the absence of the production adjustment program.

The production adjustment programme does not allow for the same control of the domestic price of rice as earlier systems that took a more direct role in rice marketing. Yield variability will now translate to price variability through changes in the quantity supplied to market. However, pressure to maintain stable prices have lead to additional measures such as short-term loans and subsidies for those who ship their crop separately to stockholding in good crop years. The simulation results show in general that policy-driven allocation of resources can lead to significant efficiency losses (see for example Table 2.4). Successful long-term reform of the rice market will require a commitment to less price intervention and the use of policies targeted more directly to objectives.

Policies for upland crops

Most upland crops outside the northern island of Hokkaido are produced on diverted paddy land. The decision to produce upland crops and the policies that apply to them are not entirely divorced from rice policy as policies such as the rice diversion programme have a strong influence on upland crop production. This connection between policies for upland crops and rice goes in both directions, as recent policy developments for upland crops have implications as well for the production of rice, as most producers of upland crops outside Hokkaido are primarily rice producers.

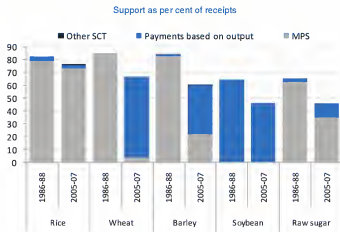
Relatively abundant land and less opportunity for off-farm employment have led the agricultural structure in Hokkaido to develop in a distinctive manner. The majority of upland crops (wheat, barley, soybean, sugar beet and starch potato) are produced in Hokkaido through normal crop rotation. Business farm households make up more than 70% of commercial farm households compared to 20% in other parts of Japan. The average farm size in Hokkaido is 18.7 ha, which is 14 times larger than that in other parts of Japan.

Before recent reforms, most upland crops (wheat, barley, soybean, sugar beet, sugar cane and starch potatoes) received primarily price support. This support was made through government purchasing of wheat and barley which was then sold to milling companies. When the private marketing system of domestic wheat and barley was put in place in 2000, output based payments to producers through the wheat management stabilization fund were initiated. This can be seen in the change in the composition of support to wheat and barley away from price support to payments based on output (Figure 2.24). Soybean producers also received deficiency payments amounting to the difference between a specified standard price and a market price. The deficiency payment was abolished in 2000 and replaced by an output-based direct payment and the soybean management stabilization scheme in which a fund, to which both government and producers contribute, pays 80% of the difference between the standard price and the market price. Sugar beet and sugar cane producers received guaranteed minimum prices that MAFF set every year and which the sugar cane miller or beet processor were required to pay. In exchange, the sugar miller or beet processors received a subsidy financed from the surcharge on imported sugar and the national budget. Starch potato producers also received an administered price in the sense that starch corn importers are required to purchase domestic starch potatoes to maintain a specified ratio of imported corn starch to domestic potato starch (12:1 in recent years) under the TRQ system.

The new Basic Law initiated a movement from price support to direct payments. Following this direction, the Basic Plan in 2005 introduced direct payments for core farmers from 2007, which are targeted to certain core farmers and intended to accelerate the structural improvement of agriculture by increasing average farm size. The Farm

Management Stabilization Programme was elaborated in 2005 as part of the implementation of this plan. The programme lays out the details of the policy, which is designed to be flexible with respect to commodities as well as promote efficient and stable farm operations.

Figure 2.24. Single Commodity Transfers to selected crops, 1986-88 and 2004-06



Source: OECD PSE database 2008.

The Law on Farm Income Stabilization came into effect in 2007 and three new direct payments for core farmers were introduced as part of the Farm Management Stabilization Programme. The first payment is based on historical area planted; wheat, barley, soybeans, sugar beet and starch potatoes are eligible for this payment. The aim is to correct for disadvantages in domestic agriculture caused by geographical handicaps as compared to other countries. The second payment covers the same commodities and is based on commodity output and seeks to encourage quality improvement of domestic products by differentiating the payment rate according to the product quality. The third payment compensates for 90% of the loss of income compared with the average income of the preceding five years (excluding the highest and lowest years) to mitigate income instabilities caused by price fluctuations. In addition to the five crops covered by the first two payments, rice is included in this payment. The payment is covered by a government fund in which three-quarters of contributions come from the government and the rest from the participating producers. With the introduction of these new payments, older commodity-specific payments based on output were abolished. At the same time, the administered price for sugar cane and sweet potato for starch processing were abolished and replaced by output-based payments, in which producers of these commodities can respond to market signals to some extent. The border policy that requires corn starch importers to source a certain share of potato starch domestically was also replaced by a surcharge on imported corn starch, the revenue from which is used to finance the output-based payments to domestic starch producers. A similar approach is taken in the case of imported sugar.

Box 2.6. Forecast of Agricultural Structure and Farm Management

The new Basic Law stipulates that the government should take measures to promote efficient and stable farm enterprises and ensure that the agricultural structure is dominated by such farms. To carry this out, the government produced the *Forecast of Agricultural Structure and Farm Management* together with the basic plan in 2000 and 2005, which sets the target year as 2015.

Based on recent trends, it is forecasted that the number of farm households will decline from 2.93 million to 2.1-2.5 million by 2015. The policy efforts already being implemented are predicted to increase the number of efficient and stable family farm households from 120-150 in 2005 to 330-370 thousand in 2015 and corporate farms from 6 000 to 10 000. Moreover, the formation of between 20 000 and 40 000 community-based farm co-operatives, promoted by the new direct payments for core farmers, is expected by 2015. As a result, in the case of paddy farming, 70-80% of paddy field area is expected to be cultivated by one of these types of core farmers by 2015.

The number of principal farmers who mainly engage in family farming is expected to decline from 2 200 000 to 1 460 000 by 2015. Aging of the farm labour force is forecasted to increase the proportion of worker older than 65 from 54% to 62%. There were approximately 12 000 new entrants to farming between 1999 and 2003 and the same rate of entry is expected to continue.

Forecast of agricultural structure in 2015 (thousands)

	2004	2015
Farm households	2 930	2 100-2 500
Family farm households which earn comparable income to those in other industries	120-150	330-370
Corporate farm	6	10
Community-based farm co-operatives		20-40
Sub-business and side-business households	1 730	1 300 - 1 400
Self-sufficient farm households	770	400-700
Non-farm households who own more than 0.05 ha of farmland	1 160	1 500 - 1 800
Principal farm labour	2 200	1 460
More than 65 years old	1 190	900
Between 40 to 64 years old	890	450
Less than 39 years old	110	100

Source: MAFF.

In terms of farm size, farm income, labour input and production technology, the average family farm size for rice producers is targeted to increase from 8.4 ha to 25 ha in Hokkaido and 1.2 ha to 15-16 ha outside Hokkaido. As a result of farm size expansion and improved technology, family labour input and production cost per ha are expected to reduce by 20-60% and 20-40%, respectively.

Forecast of rice farm management

	Farm size in 2005 (ha)		Prospects of farm size in 2015 (ha)		
	All rice farms	Rice farms with certified farmer	Family farms	Corporate farms	Community based farm co-operatives
Hokkaido	8.4	13.4	25	1 ¹	1 ¹
Non-Hokkaido	1.2	5.4	15-16	34-36	44

1. No forecast

Source: MAFF.

A key element of the Farm Management Stabilisation Programme is that payments are targeted to 1) individual farmers who are certified by the local municipality and manage at least 4 ha of land (10 ha in Hokkaido), and to 2) community based farm co-operatives that manage more than 20 ha (Box 2.4). Farm size is adopted as the payment criteria as a way to concentrate support on efficient and stable farms which can earn farm income comparable to that in the non-agricultural sector, because it is relatively easy to observe and is proportional to farm income in land-intensive farming (Box 2.6). The eligible farm sizes were chosen to be roughly equivalent to half the farm size required to earn farm income comparable to the non-agricultural sector. To take into account less favoured areas and intensive agriculture, the eligible farm size can be relaxed according to the scale of community farmland, the level of farm income or for other reasons with the approval of the local municipality. Furthermore, eligible farmers should respect certain environmentally-friendly farming practices such as appropriate fertilizer and pesticide application. As part of the reform of commodity payments, supports to sugar cane and sweet potato for starch were reorganized from administered price system to an output-based payment to farmers that meet specific criteria.

As of August 2007, 67 045 individual farmers and 5 386 community based farm co-operatives participated in the payments programme in the first year. Among these farms, the relaxed farm size requirements are applied to 12% of individual farms and 33% of community based farm co-operatives. The new direct payments for core farmers covered around 26% of the area planted to rice, 93% of wheat and barley, 77% of soybean, 97% of sugar beet and 99% of starch potato. Between participating individual farmers and community based farm co-operatives, individual farmers account for 76% in rice, 74% in wheat and barley, 64% in soybean and almost 100% in sugar beet and starch potato in terms of planted area.

There are several positive aspects to the design of the support given under the Farm Management Stabilisation Programme. The use of payments based on historical area moves support to a form likely to be less distorting of markets, and targeting these payments to specific farms according to policy objectives increases the ability of the policy to efficiently and effectively promote that policy objective. In addition, the objective of improving competitiveness through adjustments to the average farm size and structure of agriculture is a more useful approach to farm income objectives than simply providing support to all farms, either through prices or payments. To the extent that the programme is successful in promoting adjustment, it may lead to a longer-term easing of pressure to provide support in more distorting forms.

However, the extent to which competitiveness can be improved in the absence of real competition is likely to be limited, and policies that target more efficient farms alone are unlikely to be able to complete the transition of Japanese agriculture to a more efficient and competitive footing. Ultimately, this policy approach should be seen as the beginning of a process of exposing the agricultural sector to increased competition which will help to reduce the gap in competitiveness which will better equip the sector to meet the challenges arising from more open markets in the future.

Land policy

Achieving positive adjustment in land markets is a key challenge, and successfully meeting this challenge is central to the overall objectives for the agricultural sector. The policies promoting structural adjustment in the preceding sections depend on the ability

of land markets to function effectively in response to new policy incentives and new market conditions.

Fragmented ownership of land has slowed adjustment, and current policies that affect the land market have sometimes provide contradictory incentives to landowners. Land is a scarce resource in Japan and, therefore the efficient allocation of land among producers is crucial. Unfortunately, the success of farmers who wish to expand in buying or renting new land has been limited and discontinuous land holdings have held back economies of scale. This section looks at recent policy developments, and contains analysis of some of the impediments to concentrating land to large-scale rice farms and how these impediments may be resolved.

Recent policy developments

Due to the scarcity of land, preventing farm land conversion has been a high priority policy objective in Japan. The question of public corporations acquiring farmland was one of the most controversial topics of discussion in the committee that prepared the new Basic Law between 1996 and 1998 (Box 2.7). The idea of allowing corporate ownership of farmland represents to some a reversal of earlier land reforms aimed at moving control of farmland from landlords to owner-operations. It was decided that farmland should be available to private-limited companies only if they fulfil the requirements of an Agricultural Production Corporation (APC), that is, majority ownership by farmers. The restriction on ownership by private-limited companies had the practical objective of preventing speculative acquisition of farmland that would disconnect land prices from the return from its use in agricultural production. Speculative land pricing raises the costs of expansion for existing farmers and undermines the economic basis of farming.

In 2001 the law was amended to allow APCs to engage in non-farming business amounting to up to half of their sales, to attract capital from retailers or food manufacturers with integrated business relationships up to 25% of share ownership and to reduce the required days for executives to personally engage in on-farm work. The requirements for APCs before these reforms limited the scope for public corporations to enter into the farming sector.

Pressure to continue to expand the eligibility of corporations to participate in the agricultural sector grew from the effects of aging of the agricultural workforce and the insufficient number of younger farmers entering the sector. These negative trends in the agricultural labour force have had an impact on the amount of farmland that has been left idle. While the proportion of abandoned farmland was stable at around 2.8% of total owned farmland until the mid 1980's, it has been increasing since then, reaching 9.7% in 2005. The amount of abandoned land more than tripled in 20 years from 135 000 ha in 1985 to 386 000 ha in 2005. A MAFF survey conducted in 2004 indicated that the scarcity of labour arising from aging in rural areas is the major cause of land abandonment, followed by the unfavourable quality of the land.

To address the problem of land abandonment and increase the potential number of new users of agricultural land, an exemption to the Agricultural Land Act (ALA) was made allowing non-APC corporations to lease farmland from the local government in special structural reformation districts as a pilot project in 2003 and more broadly in 2005. The number of non-APC corporations that leased land under this scheme increased from 71 in 2004 to 256 in 2007, leasing 832 ha of land in total. Among these

Box 2.7. Farmland ownership regulations and the Agricultural Land Act

Agriculture in Japan is dominated by small owner-farmers, a structure rooted in the "land to the tiller" reform programme implemented after the Second World War. In pre-war Japan approximately half of the farmland was farmed by poor tenant farmers, and their uncertain situation was considered to be the cause of many social problems in rural areas. After the land reform, the proportion of land held by tenant farmers decreased to 10%. To preserve this new situation and ensure the rights of farmers, the Agricultural Land Act (ALA) was elaborated in 1952, which imposed strong regulations on farmland, limiting the size of land holdings and imposing rent control. The ALA strictly protected the tenant's rights, prohibiting land owner from cancelling a tenancy contract without the tenant's agreement. The acquisition of farmland was strictly limited to those who actually cultivated the land. Land transactions are approved by the local agricultural committees which were established in local municipalities to make a decision democratically. The majority of committee members are democratically elected from among local farmers and the rest appointed by local municipalities.

Following the introduction of the Basic Law on Agriculture in 1960, which aimed to raise agricultural productivity and farm income through farm size expansion, the strong regulations on tenancies were gradually removed. The regulation on the area of land holdings and land rent ceiling were removed in 1970 and the conditions for cancelling land rental contracts were partially relaxed. More importantly, the Farmland Use Promotion Project (FUPP) (later replaced by the Agriculture Management Basis Improvement Project (AMBIP)) was implemented in 1975, in which the regulations on tenancy were waived if the local municipality prepared a local land use project based on the agreement of the transacting parties. Consequently, most tenancy transactions (more than 97%) were made through the FUPP scheme.

Since the basic principle of the ALA is to promote the ownership of land by its actual user, an individual can acquire farmland only if he or she engages in on-farm work (e.g. plowing, weeding and harvesting) for more than 150 days a year. Therefore, corporations were not initially able to obtain the rights of farmland. In 1962 this condition was relaxed, and corporations were allowed to acquire farmland rights if the corporation met the definition of an Agricultural Production Corporation (APC), essentially an incorporated farm operator. If the corporation ceased to meet this definition, the government was required to purchase the land. The definition of an Agricultural Production Corporation includes, for example, 1) the majority of the business of the APC has to be farming and related business, 2) the articles of association have to stipulate the transfer of shares must be approved by the board of directors in the case of private-limited corporations, 3) owners must be either those who transferred land rights to the corporation as an investment in kind, those who engage in the corporation's business for certain days or those who have integrated business relationship (less than 25%) and 4) more than half of the board of directors must engage in farm work (including work such as management or marketing) more than 150 days per year (more than half of them must also work on farm for a minimum of 60 days).

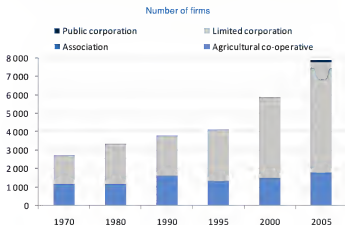
These conditions made it impossible for most of the companies to obtain farmland rights. In 2003, an exemption was added to the ALA allowing non-APC companies to obtain tenancy rights to land in a special structural reformation district if companies sign an agreement with local government regarding their farming plan and involvement in local collective activities. This pilot project was generalised to all of Japan as of 2005. However, this applies only to rental of land and such companies are still prohibited from owning farmland.

The ALA also regulates farmland conversion to non-agricultural uses, requiring the approval of the prefectural governor. This approval depends on several criteria related to the productivity of farmland such as irrigation access, land fertility and size. A farmland zoning system was also introduced through the Agricultural Promotion Areas Law (APAL) in 1969. This law requires local government to prepare a comprehensive regional agricultural promotion plan including for agricultural land use. The farmland within the zone designated as farmland area in the local plan is prohibited from land conversion. As of 2005, 87% of farmland was inside the farmland zone. Since the farmland zone can be changed by the local government with the consent of the prefectural governor under certain conditions, it is possible for farmland to be excluded from the farmland zone so that it can be converted to non-agricultural use. In 2005, 15% of all land conversions were the result of the exclusion of the land from its previous designation as farmland zone.

Land rent has been also controlled by ALA. The maximum rent was set in each local municipality by the local agricultural committee until 1970. The rent was also required to be paid on a monetary basis (sharecropping was not allowed) until 2000. With the abolition of the maximum rent, the standard rent system was introduced in 1970 in which local agricultural committees announce the standard rent in its area by type of land and advise land owners to lower the rent if it is significantly higher than the announced rent.

corporations, 34% came from the construction industry and 23% came from the food industry. Forty per cent of non-APCs engage in the vegetable sector and 19% in the rice and wheat sector (Figure 2.25). Although the government aims to increase the number of non-APC corporations to 500 by 2011, the impact of entry of non-APC corporations on agricultural structure remains small. The motivation of some of these corporations is to utilise surplus workers during seasonal low periods in their core businesses.

Figure 2.25. Agricultural Production Corporations by type, 1970-2005



Source: MAFF.

Other legal measures to prevent land abandonment have been developed. The Agricultural Management Basis Improvement Law (AMBIL) enables local municipalities to order the owner of abandoned land to submit a land use plan and has provisions for a penalty in the case of non-compliance. As of 2005, prefectural government and local municipalities are required to prepare comprehensive plans to prevent land abandonment and restore abandoned land. Moreover, local municipalities can require non-compliant owners of abandoned land to take necessary measures to restore abandoned land such as leasing their land.

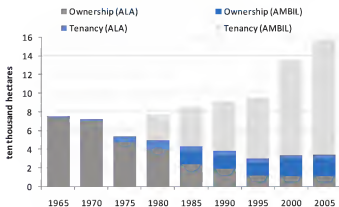
Complicating efforts to reduce land abandonment is the increasing amount of land owned by non-farmers who have either inherited land or have retired from farming. Non-farmers in 2005 represent 30% of all farmland owners and own 15% of total farmland and 42% of total abandoned land. In particular, situations arise where the ownership of abandoned land is uncertain, often because the inheritor has moved away from the region without legally registering ownership. Renting such land is made difficult as potential renters are required to have the agreement of all heirs. A survey by the national chamber of agriculture in 2007 found that 22% of local agricultural committees surveyed reported the inability to allocate use rights to potential renters due to this problem.

Structural adjustment through land markets

In order to promote rationalization in the land market, restrictions on tenancy transactions to protect tenancy rights have been gradually removed starting in 1970 (Box 2.7). The introduction of the FUPP (later replaced by the AMBIP) in 1975 accelerated farm size expansion through rental agreements (Figure 2.26). The Farmland Holding Rationalization Enterprise (FHRE) was established at the prefectural and local municipality level to act as an intermediary in land transactions. The FHRE acquires land rights from land owners and transfers them to potential renters or buyers, in an effort to reduce the transaction costs for both sides. In FY 2005, FHRE leased 12 046 ha and purchased 7 603 ha of land. It has been estimated that FHRE is involved in approximately 30% of all land transfers to certified farmers. Preferential treatments are given on income tax, fixed asset acquisition tax and property registration tax for certain land ownership transactions under the AMBIP or through the FHRE. These policies helped the share of farmland cultivated by core farmer to increase from 17% to 42% between 1995 and 2006 (Figure 2.27). The Forecast of Agricultural Structure sets a goal that 70 to 80% of farmland use should be concentrated in efficient and stable farm enterprises by 2015.

Core farmers control a growing share of farmland, though farm size expansion in the rice sector remains slow. To exploit economies of scale in rice production, large efficient farms should develop through transactions in the land market. However, since side-business farms face a lower opportunity cost of labour, they will not necessarily rent out land to large farms even though large farms can offer rents higher than the value of the marginal product of the land for small farms. Small side-business farms with low opportunity cost of labour would rent out their land only if the land rental income is greater than their realised net farm income as a whole. This condition is stronger than the usual condition that would set rent equal to the value of the marginal product of land.

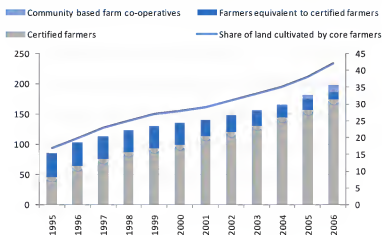
Figure 2.26. Land tenure, 1965-2005



The data include only transactions that contributed to farm size expansion.

Source: MAFF.

Figure 2.27. Area of farmland cultivated by core farmer, 2005



Source: MAFF.

If business farms use family labour and cultivate their own land and rented land, the farm profit is equal to the value of rice production less net land rental payments and labour cost (the opportunity cost of family labour). On the other hand, the farm profit of side-business farms that use family labour and cultivate their own land is expressed as the value of rice production only, with the opportunity cost of labour assumed to be negligible. The condition for a land rental transaction to take place between these two categories of farms is that the value of the marginal product of land for business farms exceeds the farm income per unit of land by side-business small farms.¹⁹

This condition implies that the productivity difference between two categories of farm must be a certain level before a rental transaction can take place. In fact, existing studies find that this condition of land rental transaction holds when approximating the value of the marginal product of land by the farm profit per unit of land. The rice production cost data for areas outside Hokkaido in crop year 2005 indicate that the profit of large farms of

19. This may be expressed mathematically by the following set of equations:

$$p \frac{\partial F_B}{\partial A} > \frac{\pi_S}{A}, \quad \pi_S = p F_S(A, L) - r(A - \bar{A}) - wL, \quad \pi_S = p F_S(\bar{A}, L), \quad \frac{\partial F_B}{\partial A} > \frac{\partial F_S}{\partial A}.$$

Where π_B , π_S , π_n - Farm profit for business and side-business farms,

F_B , F_S - Production functions for business and side-business farms.

p , r , w - Rice price, land rent and non-farm wage rate,

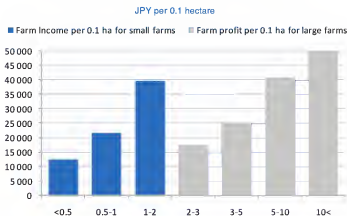
A - Cultivated area of land,

\bar{A} , L - Owned area of land and labour input.

Due to their small-scale, side-business farm households tend to rent out either none or all of their land.

more than 5 ha exceeds the farm income of small farms cultivating less than 2 ha of land, making land rental transaction between these two categories of farms possible (Figure 2.28). However, since land cannot be traded across different regions, it is more appropriate to verify the land rental condition at the regional level. The data indicate that the farm profit of the largest category of rice farms exceeds that of the smallest category of farms, except for Chugoku region.

Figure 2.28. Farm income and profit, other than Hokkaido



Source: Rice Production Cost Survey crop year 2005, MAFF

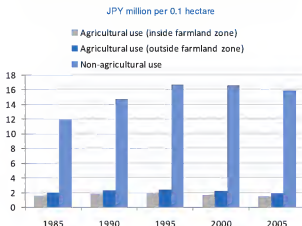
This analysis indicates that despite the requirement of significantly greater productivity on the part of large farms, there is potential for land transactions to continue to shift land towards more productive rice farms in most of the regions if land markets function efficiently.

The extent to which land markets function efficiently relates to restrictions on transactions (which have been reduced), and the influence of other potential users of land. The limited supply of flat land and the high population density in Japan has led to competition between agricultural and non-agricultural use of land, particularly near urban areas. If the return on land for non-agricultural use is higher than that for agricultural use and value of farmland reflects the potential value, then the farmland price will be higher than the present value of future agricultural production. That is, farmers will be out-bid in the land market by other potential users.

The average price of land for agricultural use inside farmland zones was JPY 1.6 million per 0.1 ha in 2005, which implies a return per 0.1 ha of JPY 50 000 every year assuming a 3% discount rate. However, the actual average farm income per 0.1 ha from paddy farming is half that amount, JPY 25 000 on average. Thus, it is usually uneconomic to expand farm size by purchasing land, except in Hokkaido, where the agricultural use value determines the farmland price in most cases. Moreover, paddy land outside urban planning zones sold for non-agricultural use typically sells for more than ten times the price of land sold for agricultural use inside farmland zones in 2005 (Figure 2.29). If farmland zones were permanently fixed where conversion inside the

zone was completely prohibited, the land market would be completely separated into two markets and the price of agricultural land would reflect its agricultural use value. Speculation (or expectation of land conversion) occurs when there is an uncertainty about land conversion regulation in which farmland may be converted to non-agricultural use in the future. Speculation on this difference and the potential to convert land from agricultural use to non-agricultural use may be driving the high agricultural land price. The recent Farm Land Reform Plan publicised by MAFF seeks to control and reduce conversion expectations by making the regulations stricter.

Figure 2.29. Paddy price outside urban planning zone, 2005



Source: MAFF.

The fact that the farmland price is higher than the agricultural use value of land creates a potential capital gain from land conversion particularly near urban areas. The expected capital gain from land conversion affects the land rental decision if leasing lowers the potential capital gain. If cancelling land rental contracts is restricted or takes time, the land owner may lose the chance for a capital gain from land conversion. Moreover, cancelling the land rental might incur a liability to grant monetary compensation to the tenants. These factors would tend to increase the rent that side-business farms would demand to rent land, reducing the potential for land transaction between the two categories of farms.

Elements of the tax system that offer particular benefits to farmland may also impede land rental transactions. A maximum inheritance tax of 50% is imposed if the value of the inheritance exceeds the sum of JPY 50 million and the number of inheritors times JPY 10 million. A progressive gift tax is also applied to gifts more than JPY 11 million per year. Since inheritance tax and gift tax on farmland are imposed according to the non-agricultural use value of farmland, the tax liability for the successor of the family farm can make farming uneconomic, particularly near urban areas. In order to prevent this situation and promote family farm succession, an amount of the inheritance tax and gift tax equal to the difference between the agricultural and non-agricultural land value is

deferred as long as the successor continues cultivating for more than twenty years (or until the death of the donor in the case of gift tax). Thus, this tax system provides farmland successors with a strong disincentive to rent out their farmland. Since most inheritances do not reach this taxable amount in practice, the application of inheritance tax deferral is usually limited to near urban areas, where farmland price is high. On the other hand, the gift tax deferral is applied more widely.²⁰ The expected capital gain from land conversion, together with the inheritance tax system, helps to explain why some side-business farms are reluctant to lease out their land.²¹

For the land rental transaction between two categories of farms, the value of the marginal product of land for business farms must exceed the profit per acre of the side-business farm, plus a premium for expected capital gain and a premium for the value of the deferred inheritance tax.

Transaction costs in the land market

In order to expand farm size by renting land, a farmer must find a potential renter and negotiate a contract. Because land ownership is very fragmented, expanding farm households are required to rent land from a number of different land owners if they wish to expand significantly, which increases their transaction costs. It is often difficult to expand farm size by obtaining adjoining land, and so large farms typically cultivate many fragmented plots. This reduces the potential for economies of scale, particularly in the case of rice farming (Figure 2.30). A survey of 202 core farmers outside Hokkaido in 2007 found that core farmers cultivate on average 28.5 plots with average plot size of 0.52 ha. The share of large plots of more than 2 ha was 26.7% (Figure 2.31). Farmland consolidation through plot exchange is limited because of the difficulty in balancing the value of plots that are being exchanged.

20. The inheritance tax and gift tax deferrals were applied to 1.3% (62 000 ha) and 5.8% (273 000 ha) of farmland in 2004, respectively. The differed amount of tax on farmland was JPY 6.5 trillion for inheritance tax and JPY 0.96 trillion for gift tax in 2004.

21. Mathematically, this is expressed as:

$$p \frac{\partial F_E}{\partial A} > \frac{\pi_S}{A} + \epsilon + \theta$$

ϵ - premium for expected capital gain from future land conversion, per unit of land,

θ - premium from deferred inheritance tax, per unit of land.

The presence of θ makes the condition for renting land more difficult to meet.

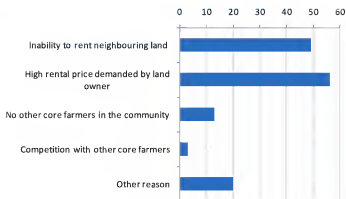
Figure 2.30 Example of fragmented farmland

Land highlighted in pink belongs to single farm operation



Source: MAFF.

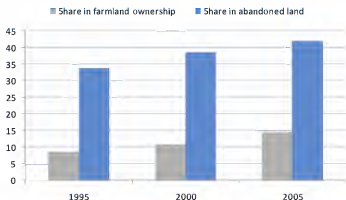
Figure 2.31. Reasons cited for discontinuous land rental



Source: MAFF Survey on farmland consolidation to 230 farm enterprises in 2007.

The aging population in rural areas will also increase the transaction cost of renting farmland, as will increasing numbers of owners who live outside the community. The 2005 census data indicates that non-farm households own 15% of total farmland and approximately half of rented land is owned by non-farm households (Figure 2.32). With the increase in retirement-age farmers, the share of farmland owned by non-farm households is expected to increase. It is sometimes difficult to identify the owner of such farmland, making obtaining a rental contract difficult. A survey by the National Chamber of Agriculture in 2007 found that 22% of local agricultural committees reported the inability to allocate use right to potential renters due to this problem. Among the agricultural committees that faced the problem, 51% reported they could not contact the land owner and 54% could not get the agreement with all the inheritors. This problem is particularly serious in rural areas where the value of farmland is low. Together with the fragmented ownership of farmland, the increase in ownership by non-farm household raises the transaction cost for a potential renter of the land. These transaction costs to expand farm size through land rental market affect the land rental condition by requiring a higher marginal productivity of land for business farms to overcome the transactions costs.²²

Figure 2.32. Non-farm household's share in farmland ownership and abandoned land



Source: 2005 Agricultural Census, MAFF.

Land abandonment

Abandoned land is a peculiar phenomenon in a country where land is scarce and its value is high. It is an unwelcome development in a country that is both land-scarce and desirous of promoting the agricultural sector and domestic food production. Land abandonment is usually an economic choice of land owners and economic incentives may exist for them to keep land idle. Specifically, farm land conversion regulations and the

22. This can be shown mathematically in the land rental condition as follows:

$$p \frac{\partial F_g}{\partial A} - \mu > \frac{\pi_g}{A} \quad \text{where } \mu \text{ is the transaction cost in renting land.}$$

land tax system may be important. In principle, land would be abandoned if the land does not produce a positive return from agricultural or non-agricultural use. In mountainous and hilly areas where aging and depopulation are significant, low profitability of land is most probably the reason that farmland is left idle.

In flat farming or urban areas, both agricultural and non-agricultural use values of land are likely to be positive. However, 46% of all land abandonment was observed in these areas in 2005. Land that is productive and profitable yet left abandoned indicates an impediment in the rental market. If non-agricultural use value is large relative to agricultural use value and the owner expects the future possibility of land conversion, the expected capital gain from land conversion may exceed the opportunity cost of land (e.g. land rent), creating an incentive for land owners to leave land idle rather than rent the land to a farmer. This is because entering into a rental contract may result in the opportunity to convert the land being missed. Normally, it is expected that well-functioning land rental markets ensure that more efficient producers will rent land from less efficient ones.

Currently, the decision regarding conversion of land to non-agricultural uses is taken at the local level and is often permitted through “exceptional” processes that have in fact become commonplace. Situations like these may hinder predictability with respect to land use and land use objectives. Land conversion will inevitably occur in farmland zones — where conversion to non-agricultural use is normally prohibited — if the zone covers most usable land. In 2005 87% of farmland was inside farmland zones and 15% of land conversion occurred by excluding the converting land from the zone. Preventing land conversion under the current system is difficult unless the land owner is somehow compensated for the loss of potential capital gain. These situations may also result from a land use plan that does not take the needs of all land users — farm and non-farm — into account, and does not properly distinguish farm areas of greater or lesser priority. Community consensus building to designate future agricultural and non-agricultural land would improve the sense of ownership of the land use plan and makes the land conversion process more controllable. The introduction of a public comment process to the farmland zoning plan under the APAL in 2005 was a step forward in this respect.

Pressure for land conversion has reduced in recent years as demand retrenched after the economic bubble of the 1980s. Demographic change will also reduce pressure for land conversion as the population boom gives way to a slow decline. Public infrastructure projects have also been big demanders of farm land, but expenditures on these have been reduced in recent years. While there is some pressure for land conversion and resulting speculation near urban areas, land abandonment in predominantly rural areas is likely now driven by economic considerations related to farming.

It would be better if the land were to be rented to another farmer who is able to operate at a more efficient scale, but this does not always occur due to land being too discontinuous to be used effectively. In addition, there are many incentives present in the tax code which discourage land from conversion and which promote the idea that land bequeathed as an inheritance should remain as a family farm. For example, in the case of farmland, a fixed asset tax of 1.4% of the asset value is calculated using 55% of the land price in agricultural use, except for some farmland in urbanizing zones. The yearly tax liability of owning farmland is low (on average JPY 1 000 per 0.1 ha outside urbanizing zones) relative to other uses of land. Inheritance tax and gift tax are deferred as long as the farm successor continues farming for more than 20 years or until the death of the donor. It may also be the case, particularly near urban areas, that landowners are reluctant

to enter into land rental contracts because they anticipate that such a contract may make it more difficult to convert the land in the future. For such land owners, low tax liability on farmland also provides an incentive to leave farmland idle. In this sense, abandoned land may partly be a symptom of speculation in the land market, or it may actually be a means to trigger a process that would lead to the possibility of converting the land to a different use.

Abandoned land can represent valuable green space in near-urban zones. This benefits the local community who may not otherwise be able to afford to purchase and maintain land as parks. The recent policy move to widen the opportunity for urban residents to farm small plots of land as a hobby in areas with abandoned land problems may be a good example (Box 2.8). A comprehensive solution to the land abandonment problem will have to take into account pecuniary effects such as these.

Box 2.8. Farmland use by hobby farmers

In response to the growing demand for recreational farming by urban residents, the Law of Specific Farmland Leasing (LSFL) was elaborated to provide an exemption for tenancy transaction restrictions imposed by ALA, in which local municipalities or agricultural co-operatives can lease small plot of land (less than 0.1 ha) to non-commercial hobby farmers for less than five years. In 1991, another law (the Law of Promoting the Development of Private Farmland for Public Use) was enacted, in which prefectural government announces the basic principles to develop hobby farm and the local municipality certifies the management plan prepared by developers of hobby farms. The construction of hobby farming facilities (e.g. rest house and storage) under the certified plan receives special treatment in farmland conversion restriction by ALA and development restrictions by Urban Planning Law. To promote land use in areas with significant land abandonment, LSFL was deregulated in 2003 so that anyone can develop hobby farms in special structural reform districts with some conditions, which was later expanded to the whole of Japan in 2005. The number of hobby farm plots and their area increased from 56 727 plots and 291 ha to 159 694 plots and 1 101 ha between 1993 and 2006. The majority of hobby farms are developed in urban areas.

In addition, the restriction on the minimum operational area (0.5 ha in Non-Hokkaido and 2 ha in Hokkaido) set by the ALA was relaxed in the special structural reform districts experiencing significant land abandonment in 2003 so that non-farmers such as retirees can farm small plots. This system was also later broadly applied by 2005.

A necessary corollary of increasing average farm size, an important objective of policy, is that the number of farmers decreases. Inheritance laws that promote farm succession within a family can be counterproductive in this situation. On the other hand, efforts to diversify the entrants into the sector by allowing public corporations and hobby farmers to participate is a positive development as it brings fresh capital into the sector.

Policies in the livestock sector

The livestock sector faces fewer constraints from land use when compared with rice or other upland crops, and livestock products are more easily differentiated from imported competitors. As a result, the sector has seen support levels fall while at the same time undergoing significant expansion. Some of the lessons learned by livestock producers may apply to other parts of the agricultural sector.

Livestock production in Japan has expanded significantly as the westernization of the Japanese diet has resulted in increased per-capita meat consumption. Per capita consumption of meat increased more than five times between 1960 and 2005 and the share of livestock production in agriculture increased from 18% to 30%. In contrast to the

rice sector, the production of livestock is dominated by business farm households. With relatively less constraints on land for farm expansion, the operational size of livestock farms increased significantly (Table 2.12). Most of the support provided to livestock as measured by the PSE is in the form of market price support generated by tariffs. The level of support in 2005-07 ranges between 10% and 60% as a percentage of receipts. Among livestock products, poultry and eggs receive a relatively low level of support (Figure 2.33).

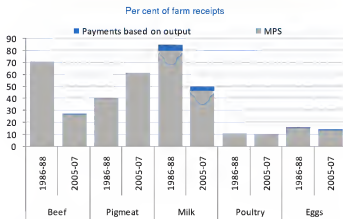
Table 2.12. Average number of animals on farm, 1960-2005

	Head			
	1960	1995	2000	2005
Dairy cattle	2	44	53	60
Beef cattle	1	18	24	31
Pig	2	545	838	1 095
Poultry	27	20 059	28 704	33 549

1. Pig and Poultry data is from 1960-2004 and 1965-2004, respectively.

Source: MAFF.

Figure 2.33. Single Commodity Transfers for livestock products



Source: OECD PSE database 2006.

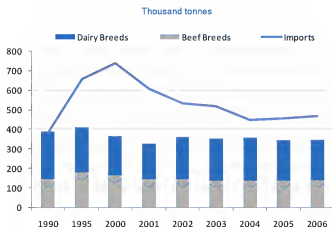
Beef policy

Per capita beef consumption saw a nearly 6-fold increase between 1960 and 2000, much of this change coming as a result of trade reforms. The import quota for beef was replaced in 1991, by an ad valorem tariff of 70%. The tariff level has reduced gradually from 50% in 1994 to 38.5% in 2000. Under the URAA, emergency measures are permitted if the respective import volume of chilled or frozen beef from the beginning of the fiscal year up to the end of the relevant quarter exceeds more than 117% of the corresponding import volume of the preceding year. In this case a higher tariff rate of 50% is applied for the rest of the year or the first quarter of the following fiscal year. This

emergency measure was exercised in FY 2003 on chilled beef. Reductions in tariff rates are reflected in the MPS of beef, which declined by 65% between 1986-88 and 2005-07. The USA and Australia are the two largest exporters of beef to Japan.

There are two types of cattle in Japan: traditional beef breeds (Japanese black, Japanese brown, Japanese polled and Japanese short horn) collectively called Wagyu; and dairy breeds (mainly Holstein). The Wagyu beef, especially from the Japanese black breed, is high quality and more highly valued than the beef from dairy breeds or imported beef (Figure 2.34). While lower quality dairy animals are exposed to strong competition from imported beef, the market for Wagyu beef is more strongly differentiated from imported beef (OECD 2005).

Figure 2.34. Domestic beef production and imports, 1990-2006

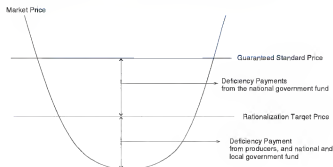


Source: MAFF.

Due to their higher exposure to import competition, producers of dairy-breed calves receive a large share of domestic policy support relative to Wagyu producers. A deficiency payment scheme, called the beef calf production stabilization system, was implemented in 1990. This deficiency payment has two trigger prices, the guaranteed standard price that aims to maintain the reproduction of beef calves and the rationalization target price that is set lower than guaranteed standard price taking into account the international beef price and domestic production costs (Figure 2.35). Two funds have been put in place for these payments, one funded by the national government and the other by producers, and the national and local governments. A payment is made when a registered calf is sold at a lower price than either one of target prices. If the average market price falls between the guaranteed price and the rationalization target price, the deficiency payment is paid financed from the national government fund. However, if the average market price goes below the rationalization target price, a payment equivalent to 90% of the difference between the rationalization target price and the average market price is financed from the other fund. Since Wagyu beef is differentiated from imported beef, the average price of Japanese black breed calves is

usually higher than the guaranteed standard price, such that producers of these breeds have received payments only twice since 1990. The producers of dairy-breed calves received payments almost every year and more than 90% of total payments are made to dairy-breed farmers.

Figure 2.35. The deficiency payment scheme for calves



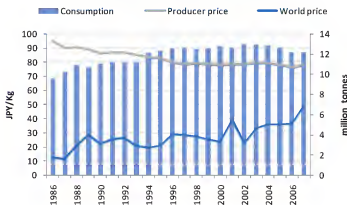
Pork policy

Approximately half of the pork supply is produced domestically. In 2007, 36% of imports came from the United States, 22% from Canada and 21% from Denmark. An ad-valorem tariff of 4.3% is imposed on fresh, chilled or frozen pork, as long as the import price is above a specified gate price. When the import price is lower than the gate price, importers are required to pay the difference between the import price and standard import price, making the gate price effectively a floor on the price of pork imports. The standard import price for pork is equal to the gate price plus the 4.3% ad-valorem tariff. As a result of the URAA, the gate price and tariff rate for carcasses were reduced from JPY 447.6 per kg and 5.0% in 1994 to JPY 393 per kg and 4.3% in 2000, respectively. In compensation for applying a gate price below the bound level, Japan can as an emergency measure raise the gate price to the bound level under conditions specified in the URAA. If the quantity of imports from the beginning of the fiscal year up to the end of the relevant quarter exceeds 119% of average quantity of imports during the corresponding quarter in three preceding years, the gate price is increased to the bound level for the rest of the fiscal year. If the situation described above occurs at the end of the fourth quarter, the gate price is set to the bound level for the first quarter of the following FY. Since the volume of imports in every first quarter between 2001 and 2004 has met these conditions, the gate price was raised from JPY 393 per kg to the bound rate of JPY 489 per kg throughout that period.

Dairy policy

Due to the practical inability to import fluid milk from abroad, dairy farms in Japan retain a natural monopoly in the fluid milk market. Imports of dairy products are subject to tariff or tariff-rate quotas. The tariff rate for cheese, ice creams and dairy products containing less than 30% of milk constituents ranges between 20 to 40%. TRQs are applied to other dairy products. Imports within TRQs are subject to a low ad valorem tariff rate, ranging from 0% to 35%, and compound tariffs are imposed on over-quota imports. The difference between world prices and domestic prices taken as a whole has declined, but domestic prices were still on average more than double the world price in 2006 (Figure 2.36). The state trading enterprise, ALIC, receives the largest TRQ of 137 000 tonnes of fluid milk equivalent and imports dairy products according to domestic market trends. ALIC is allowed to mark up the price before selling into the domestic market. In addition, MAFF allocates 1 539 000 tonnes of fluid milk equivalent of TRQ to private enterprises. TRQs are set for some dairy products such as skim milk powder, butter and whey for specific purposes such as school lunches and animal feed following the URAA.

Figure 2.36. Milk consumption and prices, 1986-2007

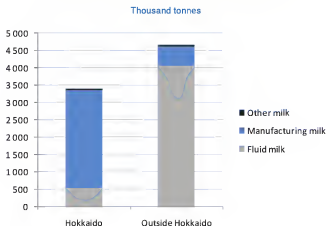


Source: OECD PSE Database 2008.

Domestic dairy policy is focused on supporting producers of milk used for processing (also called manufacturing milk), which has a lower price than drinking milk and faces international competition. The payment for manufacturing milk is intended to ensure the production of milk in remote areas, particularly Hokkaido, where manufacturing milk production is concentrated (Figure 2.37). The amount of manufacturing milk eligible for payments is set according to the market demand, and was 1.98 million tonnes in 2007. Milk produced beyond this amount is not eligible for payments, and is usually uneconomic. In addition, the national producer's group, the Japan Dairy Council (JDC), manages a voluntary supply control system since 1979, in which approximately 97% of producers participate. The JDC announces the target supply of raw milk and allocates the production quota to producers through its regional associations. If the regional associations produce more than their allocated quota, the JDC can impose penalties

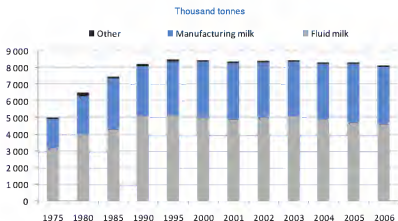
(e.g. JPY 40 for each extra kilogramme produced and/or the reduction of quota for the following year). The target supply of raw milk is around 7.9 million tonnes in 2008 (Figure 2.38).

Figure 2.37. Regional composition of milk production



Source: MAFF.

Figure 2.38. Milk production by type, 1975-2006



Source: MAFF.

Until 2000, the payment for manufacturing milk was administered as a deficiency payment, where the government paid the difference between the guaranteed price and the standard transaction price. This payment system was revised in 2001 to an output-based direct payment, where a fixed rate is paid on the basis of the production cost (JPY 10.55 per kg in 2007) (Table 2.13). In 2001, the standard prices for several dairy products such as butter and skim milk powder were abolished, as well as the market intervention system to maintain the market price at the standard level. This move away from a market-intervention-based system to a payment-based system is designed to improve the market orientation of dairy farmers. The move to market orientation is moderated by the introduction in 2001 of a programme designed to stabilize the income of manufacturing milk producers. The producer management stabilization programme introduces a government- and producer-financed fund to compensate the revenue loss when the price of manufacturing milk falls. If the current price falls below the average price in the preceding three years, participating producers receive 80% of their revenue loss from low prices.

Table 2.13. Payments to manufacturing milk

	1960-65	1965-70	1970-75	1975-1980	1980-85	1985-90	1990-95	1995-2000	2000-05	1960-2005
Agriculture										
Production index	2.3%	2.3%	1.1%	-0.2%	2.0%	-0.8%	-0.9%	-1.2%	-1.0%	0.4%
Employment index	-3.9%	-3.7%	-6.2%	-3.0%	-2.6%	-2.5%	-3.6%	-2.5%	-2.6%	-3.4%
Labour productivity	6.4%	6.3%	7.8%	2.8%	4.7%	1.7%	2.7%	1.4%	1.7%	3.9%
Manufacturing										
Production index	11.2%	15.8%	1.8%	6.2%	3.5%	4.5%	-0.9%	0.9%	0.3%	4.7%
Employment index	4.0%	3.7%	-0.5%	0.3%	1.2%	0.7%	-0.7%	-1.9%	-2.9%	0.4%
Labour productivity	6.9%	12.0%	2.3%	5.8%	2.2%	3.8%	-0.2%	2.9%	3.2%	4.3%

Source: MAFF.

Market price support is the difference between the domestic and world price, measured on a consistent basis. The impact of a policy reform may not be fully reflected by this measure when special conditions affecting how prices adjust are present. In particular, the non-tradability of fluid milk may lead to a domestic price above the world price. This possibility was investigated using the PEM. The way this is done is by using a scenario that eliminates tariffs, thus aligning the domestic manufacturing price with the world price. If domestic producers require a higher price than this to supply milk into the domestic market, then the fluid price will remain above the world price, demonstrating a natural fluid premium. This is not a policy scenario, it is simply investigating whether a fluid premium may exist.

The results show that only a very small or zero fluid milk premium would be maintained in the absence of market intervention in 2006 (the most recent year available in the model). The elasticity of the fluid demand is important in determining price adjustment, so three alternatives are considered. The first is the base demand elasticity in the model, -0.259. The less-inelastic scenario uses a demand elasticity of -0.5 and the more-inelastic scenario uses an elasticity of -0.1. A natural fluid premium is observed only in the less-inelastic demand scenario, where downward price adjustments are more limited (Table 2.14).

Table 2.14. Existence of a natural fluid milk price premium

	Initial values	Using base parameters of model	With less inelastic fluid demand	With more inelastic fluid demand
~ Simulation outcome ~				
Fluid milk production (million tonnes)	4.73	5.73	6.33	5.10
Manufacturing milk production	3.35	0.14	0.00	0.78
Fluid milk price (1000 JPY/tonne)	79.41	38.04	44.66	37.99
Manufacturing milk price	70.50	38.04	38.05	37.99
Fluid milk premium	8.91	0.00	6.62	0.00

Source: OECD PEM.

Another part of the story of whether a natural fluid premium will exist has to do with the initial world price level. World prices for milk products were high in the study year (and even stronger in 2007). High world prices reduce the probability of a natural premium as it takes a higher domestic price to establish its existence. In past years world prices allowed for significant fluid premia, with a premium of nearly 300% estimated in 1987, and a premium of 90% as late as 2002, after which the level of the premium drops dramatically. It may be more appropriate to speak not of a natural premium, but more that the lack of tradability sets a floor under domestic prices that insulates them from the impact of large swings in world prices. Manufacturing milk production enjoys no such protection, and it is important to note that a condition for the existence of a price premium is that no manufacturing milk is offered by domestic producers at the world price.²³

Fruit and vegetables policy

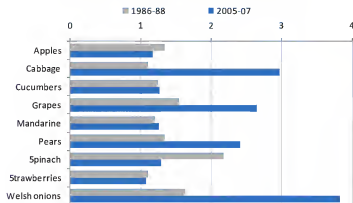
Like the livestock sector, fruit and vegetable producers face less constraints resulting from land use. Fruits and vegetables also face relatively low trade barriers as product differentiation means imported products compete less directly with domestic products. Sanitary and phyto-sanitary (SPS) regulations also limit import competition in some cases.

Per capita consumption of vegetables has been relatively stable in terms of quantity, but increasing demand for high-value vegetables significantly expanded the value of consumption. The share of vegetables in agricultural production value went from 9.1% to 23.5% between 1960 and 2005, exceeding the value of rice production. Fruit consumption increased both in quantity and value. Due to its perishable nature, fresh vegetables are expensive to import, which gives a natural advantage to domestic producers. Moreover, fruits and vegetable tend to be highly differentiated products with consumer preferences differing by country. With an advantage in transport cost as well as a competitive advantage in supplying the particular demands of domestic consumers, domestic producers supply more than 80% of vegetables consumed in Japan, despite relatively low tariff protection. Tariff rates for most fresh vegetables are 3%, whereas those for frozen vegetable and dried or provisionally preserved vegetable are normally 6% and 9%, respectively, though special safeguards are sometimes used. Protection provided to certain fruits and vegetables measured by the Nominal Protection Coefficient (NPC) has increased compared with the 1986-88 period. In particular, NPCs for cabbage, grapes,

23. Annex 1 contains a discussion of why this must be the case.

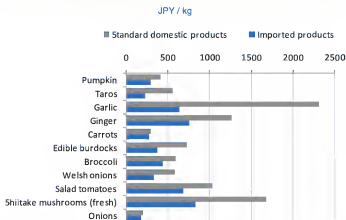
pears, and welsh onions have increased significantly (Figure 2.39). However, imported products are usually sold at a lower price than domestic products, indicating domestic producers' ability to obtain a price premium through product differentiation (Figure 2.40).

Figure 2.39. Producer Nominal Protection Coefficient



Source: OECD PSE Database 2008.

Figure 2.40. Comparison of retail prices of Imported and domestic vegetables



Average retail prices in major cities in 2005. The standard domestic products are not differentiated by quality or production methods such as organic products.

Source: MAFF.

In contrast to the rice sector, business farm households produce 82% of vegetables and 67% of fruit in 2005. Relatively low storability of vegetables and fruit requires careful coordination of production and marketing, and so market prices can sometimes be volatile. The main goal of vegetable and fruits policy is price stabilization. The *Vegetable Production and Marketing Stabilization Act* was elaborated in 1966 to stabilize vegetable production and marketing through promoting coordinated production as well as supporting vegetable farmers in the case of a price fall. In addition to supporting vegetable producers, this scheme has the goal of insulating consumers, who are considered to be risk averse, from price hikes. Under this scheme, a target planted area for the 14 most-consumed vegetables is specified according to forecasted demand announced by MAFF. Then, the national producer groups allocate target area to each region, which is further allocated to each local co-operative or farmer. In order to compensate for price variability, the government and participating producers have set up a Vegetable Supply Stabilization Fund (VSFF). The VSFF pays participating farmers 90% of the difference between average market price in a season and the guaranteed standard price, in principle. The level of the guaranteed standard price is set as 90% of the average wholesale price for the last nine years. An additional 28 varieties of vegetables have similar price stabilization schemes in place that are managed at the prefectural level.

Overall, support provided to sectors other than rice follows a pattern of lower support to producers who face less import competition, and higher support to producers more exposed to such competition. The degree of import competition depends on cost factors such as the transportability of milk or vegetables, but more important from a policy perspective are products that are differentiated from imports and as a result have a comparative advantage in the domestic market. That such specialty products can be produced profitably without (or very low) support or protection is not surprising, and provides an indication of the direction a competitive and market-oriented agricultural sector would take. Import-substitution style policies that protect domestic producers of undifferentiated commodities that are traded in a raw or nearly raw state are unsustainable and incompatible with the objective of developing an efficient and competitive sector that can earn returns equal to other sectors of the economy. Moreover, such policies help to maintain production that competes for resources with those agricultural products that can be produced profitably and whose development should be promoted.

Rural and environmental policies

The new Basic Law has broad responsibility for the promotion of rural areas and the natural cyclical function of agriculture. Although the share of agriculture in the rural economy is relatively small, enhancing and maintaining its non-commodity outputs in rural areas is a central objective of agricultural policy. This is most clearly evident with respect to sustaining rural areas and traditional landscapes. Moreover, in response to the increasing interest in environmental conservation, there have been significant developments in agri-environmental policies. The formulation of these specific policy objectives is expected to transform agricultural support from broad sectoral support toward more targeted support.

Rural policy

The Direct Payment to Farmers in Hilly and Mountainous Areas was introduced in 2000 to stem the increase in land abandonment in hilly and mountainous areas. These areas are of particular concern as a result of the relatively unfavourable economics of

agriculture in hilly and mountainous areas and the reduction in the number of core farmers in these areas. Maintaining agricultural production in these areas is seen as a means to prevent soil erosion, preserve water resources, support rural communities and maintain the rural landscape (Box 2.9). The direct payment provides an incentive to continue farming activities in such less-favoured areas.

Box 2.9. Multi-functionality of paddy fields

Since most of the regions in Japan are in the Asian monsoonal zone receiving abundant precipitation favourable to paddy farming, two thirds of farmland outside Hokkaido is paddy, with pasture accounting for only 3% of farmland (excluding Hokkaido) in 2006. Paddy farming requires intensive use of water, consuming 55 billion cubic meters per year in 2004 (approximately two third of all water consumption in Japan). To control the water supply to paddy fields, a highly organized irrigation network has been developed and users associations over several hundred years have built up communal rules of irrigation. Due to the water management system that repeatedly fills and drains the water, paddy farming allows repeated production of rice without large loss of soil fertility.

Farming on rice paddies provides functions beyond food production, the most notable of which is water buffering. Since Japan has climatic and geographic characteristics of intensive rain fall and steep topography, rain can lead to rapid water flows in rivers and damaging floods. Along with forest, paddy fields and their irrigation canals retain water and allow water percolation to recharge ground water. Through these water-buffering functions, paddy fields contribute to flood prevention, ground water recharge, land slide prevention and soil erosion prevention. The decline in paddy field area (17% decrease between 1990-92 and 2002-04) means that the agricultural water retaining capacity declined by around 15% between 1990-92 and 2002-04, leading to increased risk of soil erosion and flooding (OECD 2008a).

According to some studies, paddy fields can provide a higher level of ecosystem service than other land uses. Nitrogen leaching into surface water and groundwater from paddy field is low compared to vegetable fields and orchards, due in part to denitrification, a process characteristic of submerged soils. Although denitrification leads to the release of nitrous oxide, a powerful greenhouse gas, the amount released from paddy fields is small compared to that from dry land farming. Moreover, paddy field watersheds can further reduce nutrient pollution by using a recycling irrigation system. Paddy fields also help maintain bio-diversity by harbouring insects, amphibians, fish and birds.

Focus in Japan, however, appears to be on estimating multifunctional benefits but these need to be balanced by cost estimates, but valuation of these costs is far less advanced. There are also negative externalities associated with paddy farming such as methane emissions.

The direct payment is designed to compensate 80% of the difference in production cost between each less favoured area and the average flat area. Recipients commit to continue farming for more than five years and to carry out activities that bring multifunctional benefits such as preventing soil erosion, promoting recreational activities or preserving bio-diversity. In 2007, 665 000 ha of land received the payment, covering 82% of eligible farmland mostly in hilly and mountainous areas.

Depopulation, aging population and related issues are particularly significant in rural areas, reducing the ability of rural communities to maintain common resources such as irrigation canals, farm roads and rural landscape through collective action (Box. 1.1). In addition, increasing public concern over environmental problems has made clear the need to place more emphasis on environmental conservation. The Rural Development Programme, introduced in 2007 is intended to address these issues. This programme encourages community initiatives aimed at conserving the quality of common resources such as land and water, as well as improving the environment with a view to sustainable rural development. The new programme has two tiers. The first tier supports community activities in which local farmers and non-farmers work together to conserve the quality of

rural resources, e.g. preservation of local biodiversity, cleaning up irrigation canals, weeding of roads and improvement of the rural landscape. The payment is made to the participating community organization according to the targeted area of community activities. The second tier of this programme supports environmentally friendly farming activities that reduce the application of chemical fertilizer and pesticide by more than half compared to conventional farming practice in the region. The payment is made on a per hectare basis to groups of farmers who participate in such collective farming activities. The payment rate is calculated so as to compensate for the additional cost of adopting such environmentally friendly farming practices. Furthermore, this programme supports communities that promote environmentally friendly farming practice by means of training, soil analysis and so on. A fixed payment of JPY 100 000 is made to eligible communities.

By mid 2007, 17 065 community organizations participated in the programme and the payments covered approximately a quarter of total farmland (1.1 million ha of land). Among these communities, 2 039 groups of farmers, cultivating 44 000 ha of land, joined the second tier programme, which compensates for the additional cost of implementing environmental friendly farming practices.

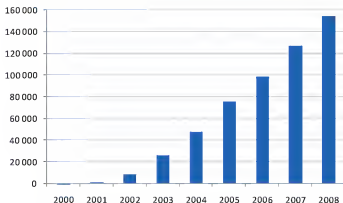
Recent reforms to the rice diversion programme will reduce its role in distributing rice production to different regions. Payments for less favoured areas are likely to be more effective as a rural development policy as they are more targeted and better separated from other objectives such as food security and farm income. This provides a more flexible and transparent tool to the policy maker. In the longer term, demographic change and consolidation in rural areas will likely require more careful priority-setting with respect to preserving rural areas, as the existing pattern of communities may not be sustainable in its entirety.

Environmental policy

Sustainable development of the agricultural sector is another major policy objective. Despite the reduction in phosphorus surplus over the past 15 years, Japan has the highest intensity of phosphorus surplus per hectare of agricultural land across OECD countries, nearly five times above the OECD average (OECD 2008). This high input intensity is partly explained by the forces to induce farmers to substitute land with other factors of production such as purchased inputs in land scarce country like Japan. Nonetheless, a number of steps have been taken over the last decade to mitigate the environmental impacts of agriculture and improve its environmental performance. In 1999, the certification system of “Eco-farmers” (farmers whose sustainable farming plan is certified by the prefectural government) and financial and technical support for such farmers was established under the law for *Promoting the Introduction of Sustainable Agricultural Practices*. The number of certified “Eco-farmers” has increased to 155 000 as of March 2008, approximately 8% of all commercial farms (Figure 2.41). Regulatory standards for manure management were established in 1999 under the law concerning *Appropriate Treatment and Promotion of Utilisation of Livestock Manure*. National and local governments finance facilities that recycle farm waste, such as manure, and specify a mandatory standard for livestock manure management that applies to livestock farms operating more than a certain number of animals (10 for cattle or horses, 100 for pigs and 2000 for poultry). As a result, the dumping of manure declined from 9 million to 1 million tonnes between 1999 and 2004. About 90% of manure (80 million tonnes) is

now processed into fertilizer and 8% is purified, carbonated or burned to prevent environmental damage.

Figure 2.41. Number of farmers certified as Eco-Farmers, 2000-2008



Source: MAFF.

Subsequent to the Basic Plan of 2005, the *Principles of Agricultural Production Practice harmonized with Environment* was announced, laying out the necessary agricultural production practices that farmer should adopt for environmental preservation. These principles initiated a further movement to cross compliance measures targeted to environmentally beneficial practices, more clearly defined policy goals and the provision of a policy evaluation framework. In 2007, participation in 26 programmes including the new direct payments for core farmers is linked to application of these principles as a cross compliance measure.

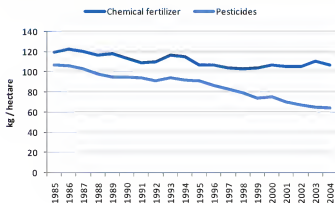
In 2002, a set of programs was put in place to promote the utilisation of biomass energy and bio-based products derived from organic waste, such as food, plant and animal waste, as part of Japan's efforts to deal with global warming and achieve sustainable development. The set of programs, called the *Biomass Nippon Strategy*, aims to recycle 80% of organic waste (which includes livestock manure) and utilize more than 25% of unused biomass (carbon equivalent terms) by 2010. Based on this strategy, wide-ranging programs were implemented from 2003. For example, certain communities will be designated as model areas for implementing projects for making full use of biomass. Financial assistance for private companies to develop biomass-related technologies is also foreseen.

Expenditure on agri-environmental programmes more than doubled over the 1990s, now amounting to 10% of total payments to farmers. Budget outlays on programmes related to the agro-environment amounted to JPY 43 billion (USD 343 million) in 2001 and JPY 38 billion (USD 304 million) in 2002. These programmes include financial support for farmers' groups and local governments that introduce farming practices that reduce excessive use of fertiliser and pesticides, and to set up agricultural facilities for recycling. Adoption of sustainable agricultural practices is encouraged by concessionary

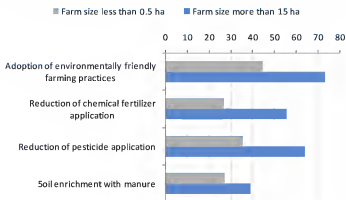
loans, tax relief to farmers to help reduce chemical fertiliser and synthetic chemical pesticide use, and also a mandatory code of practices for pesticide application. Direct payments to farmers in hilly and mountainous areas aims to prevent abandonment of farming and maintain a range of ecosystem services associated with farming in these areas. Tax exemptions, low-interest loans, regulatory standards and other policy instruments are also used to address agri-environmental issues. The estimated application of chemical fertilizer and pesticide per hectare declined 11% and 40% between 1960 and 2004 (Figure 2.42).

The structural policy promoting large-scale farms can also bring environmental benefits. Agricultural census data indicate that large-scale rice farms tend to have a higher adoption rate of environmentally friendly farming practices. For example, while 73% of rice farms that cultivated 15 ha of paddy adopted environmentally friendly farming practices, only 44% of those that cultivate less than 0.5 ha of paddy did so (Figure 2.43). Due to the fixed week-end time available for farming, small-scale side-business rice farms limit their total labour input by substituting other purchased inputs. Moreover, some large-scale rice farms, that market their own products, differentiate according to environmental characteristics and food safety. Pesticides and fertilizer purchases per unit of land for small-scale rice farms is significantly higher than that of large-scale rice farms (Figure 2.44).

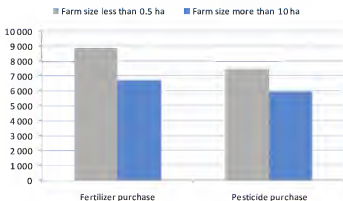
Figure 2.42. Estimated amount of chemical fertilizer and pesticide application



Source: Annual Report on Food, Agriculture and Rural Areas (FY 2008), MAFF.

Figure 2.43. Adoption of environmentally friendly farming practice for rice farms

Source: 2005 Agricultural Census, MAFF.

Figure 2.44. Fertilizer and pesticide purchases by rice farms
JPY per 0.1 hectare

Source: Rice production cost survey, 2005.

Chapter 3.

Future Directions of Japanese Agriculture and Policy Reform

Evaluation of agricultural policies

Japan's agricultural policy reforms are evaluated in this section based on the operational criteria of transparency, targeting, tailoring, flexibility and equity which were agreed by OECD Agricultural Ministers in 1998. These evaluation criteria are designed to support an economically healthy sector that contributes to the wider economy, respects natural resources and uses inputs effectively without resorting to distorting subsidies. This section concludes with some specific recommendations to continue the reform process.

The direction of agricultural policy reforms, discussed in Chapter 2, is generally in line with the policy principles of greater transparency, targeting, tailoring, flexibility and equity. Initial movements from a price based policy to a more targeted approach to support farm income in the new Basic Law are an important first step towards a more market oriented agricultural policy. A notable change is the elimination of administered prices for rice, wheat, soybean, sugar beet, starch potatoes, sugar cane and manufacturing milk. However, much remains to be done before the benefits of reforms will truly be felt by producers and consumers.

Although the level of market price support declined by more than 39% between 1986-88 and 2005-07, the main components of agricultural support are little changed. The combined share of most market distorting payments (market price support, payments based on commodity output and payments based on variable inputs without corresponding constraints) declined slightly from 95% to 93% of the PSE. There was also little improvement in the share of Single Commodity Transfers (SCT) in the PSE, which fell by one percentage point from 93% between 1986-88 and 2005-07. SCT payments tend to direct farmers towards specific commodities, and so can be a more distortive form of support. The introduction of the direct payments for core farmers in 2007 was a clear step away from such support, but its share in overall support remains small and the overall agricultural support system remains primarily oriented towards rice.

Developments in rice policy such as the reform of rice marketing arrangement and increasing the flexibility in the way the production adjustment policy is applied clear the way for a substantial improvement in the market-orientation of the rice sector, in which the government has historically controlled all stages of the market. The rice price now responds to domestic market demand and supply, helping the market to work more efficiently. However, policy makers have been reluctant to completely relinquish control

of the rice price; the production adjustment programme's effect on the domestic rice supply leads to higher prices than would otherwise prevail.

Attempts to limit support to more efficient producers are an innovative example of policy targeting. Improving competitiveness through increasing average farm size and the share of business-oriented farmers is a more constructive and sustainable approach to farm income objectives than simply providing support to all farms, either through prices or payments. The introduction of the income support programme for core rice farmers in 2004 and the direct payments for core farmers in 2007 were important steps. To the extent that this approach is successful in improving competitiveness and efficiency, it may lead to a longer-term easing of pressure to provide more distorting forms of support.

The introduction of the direct payment to hilly and mountainous area is a positive move in that it more directly targets areas and individuals where income problems are likely to be more severe. These are also the areas of greater policy interest in terms of preserving traditional landscapes and environmental values. Such payments are, however, no substitute for a comprehensive rural policy that goes beyond the agricultural sector.

Reforms that have expanded the scope for new entrants into the farming sector and relaxed rules governing the acquisition of farmland are positive steps towards revitalizing the sector, which has had difficulties in attracting new entrants and is characterised by an aging agricultural labour force. Corporations in non-agricultural sector and other potential new entrants could bring new capital into the sector, and are likely to take a business-oriented approach to farming. Policies that restrict production of certain commodities or otherwise distort market risks blunt the attractiveness of the sector to new entrants by limiting their ability to maximize returns from their farm enterprises.

Policy efforts to promote environmentally friendly agriculture have accelerated over the last ten years. The implementation of the certification system of "Eco-farmers" and the establishment of livestock manure management in 1999 can be seen as positive developments. The announcement of the principle of environmental conservation in agricultural production in 2005 initiated a further movement towards cross compliance measures targeted to environmentally beneficial practices, more clearly defined policy goals and the provision of a policy evaluation framework.

In the area of trade policy, Japan has been actively pursuing FTAs since 2000, signing agreements with Singapore, Mexico, the Philippines, Thailand, Malaysia, Indonesia, Brunei and Chile. These FTAs eliminate or reduce tariffs or introduce preferential tariff-quotas for several sensitive agricultural products. While this movement is a positive step toward opening markets, it should be considered as a complementary to multilateral trade liberalisation.

Recommendations for future policy reform

1. Efforts to improve the competitiveness of the agricultural sector will have limited success so long as the sector is protected from competition. The targeting of transfers towards larger farms is a potentially effective approach to promote increased efficiency and can reduce the cost of agricultural support. However, this must be complemented by increased openness in markets domestically and internationally if the objective of a more competitive agricultural sector is to be achieved. In particular:
 - The production adjustment programme for rice hinders competitiveness by increasing producers' costs, and muting market signals. This programme should be scaled back through a gradual reduction of the subsidies to diverting rice production to other crops, with the intention of a smooth contraction of the amount of diverted area of land. Reducing the government intervention in setting or allocating production quota leads to greater share of rice supplied by efficient rice farms and in regions more favourable for rice production.
 - The need for transition assistance might arise, in particular for the large-scale business farms that will form the foundation of the sector in the future. The reform experience in OECD countries shows that reform processes that are carefully prepared and accompanied by appropriately designed adjustment measures are more acceptable and more enduring. Such adjustment measures should be time-bounded with the provisions known in advance. It is also important that government takes into account the potential of different agents to adjust and should remove any obstacle to needed adjustments (*e.g.* facilitating efficient land markets).¹ That the simulation results show that the transfer efficiency of the diversion program is low makes the feasibility of a transition adjustment program more likely.
 - Production quotas exist in certain markets, in particular for fluid and manufacturing milk as well as for vegetables. Quotas discourage competitiveness by reducing competition among producers and allowing less-efficient producers to continue in the marketplace. The decision concerning how much to produce and its timing should ultimately be left to the individual producer, and policies controlling production should be reviewed with a view to their ultimate elimination. Existing programs that make payments when farmers suffer revenue declines are likely to be more effective than quotas at securing farm income, while at the same time provoking fewer market distortions.
 - Payments that are more decoupled from production such as the historical area component of direct payments to core farmers do a better job of transferring income to farmers while allowing for continued improvements in market-orientation and competitiveness. Programs offering payments in the event of a fall in revenue, in place for rice, wheat, barley, soybean, sugar beet, starch potato, beef, milk and vegetables, have a role to play in the near term, but should ultimately be folded into the historical area component of the direct payment to core farmers programme, which should see its commodity scope expanded as a result.

1. See for more information OECD (2005) *Adjustment Options and Strategies in the Context of Agricultural Policy Reform and Trade Liberalisation*.

2. Policy objectives to preserve the multifunctional benefits arising from paddy land lead to policies aimed at its preservation, while at the same time the production of rice is restricted in order to manage the domestic market. Resolving this fundamental conflict between objectives will be a part of any long-term policy framework. Support that increases commodity prices promotes intensive production, leading to degradation of water quality and other environmental damage. Shifting the focus to policies based on land use can lead to more extensive production that enhances multifunctional benefits while at the same time reducing the use of costly and environmentally harmful chemical inputs.
 - Simulation results using the PEM show that reducing land diversion under the production adjustment program can lead to significantly more extensive production, such that the change in the rice price and production may not be unmanageably large. Easing the level of overall price support by reducing the amount of land diversion can help to close the gap between desired paddy area and desired rice production.
 - Replacing price support with payments based on land can lead to gains for producers and consumers alike because of the higher transfer efficiency of such policies. In addition, such policies would also promote the more extensive use of land as farmers would substitute land for other purchased inputs. Such policies would contribute to greater use of paddy land for rice despite declining rice consumption as well as leading to a higher proportion of support being captured by producers.
3. Land markets should become more dynamic and obstacles to land transactions should be reduced. The price of land is an important signal for the allocation of resources, so getting land markets right will be crucial to establishing a more competitive and successful sector. Currently land owners are uncertain about the possibility of converting their land to non-agricultural uses, and disincentives (regulatory and fiscal) to selling or renting land exist. While the goal of land use policy generally is to preserve the amount of land used for agriculture and reduce the cost of land to farmers, success in achieving these goals has been mixed. In particular, restricting land conversion without completely foreclosing the possibility of land conversion in the future introduces policy risk into the land market and may result in speculation. This can have the effect of delaying investments and discouraging rental transactions. Current land regulations are not well suited to address the situation where agricultural production on a certain plot is not economically viable—prohibiting conversion results in under-use of land as the land is left idle.
 - Regulations preventing conversion of land from agricultural to non-agricultural uses should be more targeted to zones of special interest in terms of agricultural productivity or multi-functionality, keeping in mind the size of the domestic rice market. Such targeting will be more successful if it also has the consensus of local residents and if agricultural support (e.g. payments or general services support) is concentrated to the targeted zone. The reduction of pressure to convert land to non-agricultural use will also help to enable land policy reforms. In general, overly broad and strict restrictions on land conversion lead to transactions occurring through exceptional processes that thwart consistent land use planning. A more targeted zoning policy will lead to a more effective and controlled land policy and

- improved transparency that will better serve the policy goal of preserving productive farmland.
- Taxation policy should be evaluated with respect to identifying and removing unanticipated barriers to land transactions. A necessary corollary of increasing average farm size, an important objective of policy, is that the number of farmers decreases. The inheritance tax system that promotes farm succession within a family can be counterproductive in this situation. The inheritance tax and gift tax on farmland, which is deferred on the condition that the family successor continues cultivating for 20 years, should be reviewed to promote succession of farmland to non-family members.
 - Tax policy should also be reviewed with a view to reducing incentives for land market speculation and holding idle land. The low cost of holding idle land contributes to speculation in the land market as some land-owners may simply wait for the chance to convert their land to non-agricultural use. Special tax treatment of agricultural land should be reviewed to ensure that the social opportunity cost of idled land is taken into account. This could be achieved through a closer harmonization of land tax rates across different uses, and in some cases through a higher fixed asset tax on idle land or farmland outside targeted zones.
 - Public coordination of land rental transactions should be strengthened such that the search and negotiation costs for renting are reduced. This will help to address high transaction costs in the land market. Land fragmentation is a challenge made more difficult by unclear or complicated situations of land ownership. Helping to identify land-owners, who can potentially rent out land, and facilitate rental agreements will help consolidation in the land market and contribute to increasing farm scale.
 - Government intervention in land rent through such means as announcing standard rents and advising land owners to lower the rent should be reconsidered. The rental price of land is an important market signal to achieve efficient allocation of land among farmers. Currently, local agricultural committees announce standard rents for their areas, which can impede flexible price adjustment. When such rental controls are in place, they discourage landowners from renting out their land, risking leaving land idle.
4. Food security is an important policy objective for Japan. Food security policy should reflect the fact that the most important risk in world food markets has to do with price rather than quantity. Absolute scarcity of food is unlikely to constitute a major risk for a developed nation such as Japan in the context of global markets. Current conditions in the world rice market have led to sharp price increases. While this increase in price undoubtedly causes hardship for some developing countries, the world price still remains well below the price paid by Japanese rice consumers today. The natural evolution of demographics on the demand side will act to improve the food self-sufficiency rate over the long term. There are several actions that can be undertaken to enhance food security that do not conflict with the goal of improved market-orientation of the sector.

- Food security will best be improved through establishing a competitive, efficient farm sector. Quantitative targets for food self-sufficiency are useful for measuring progress, but should not become an impediment to needed reforms.
 - Policies to reduce waste in the food chain and recover food waste have the potential to improve food security and the self-sufficiency rate in a positive way. Effective use of food waste as animal feed may have a positive impact on the self-sufficiency rate in feed.
 - Promoting locally-produced food is a constructive approach to increasing the self-sufficiency rate. However, efforts to promote the "Japanese style of diet" are more likely to succeed if the price of traditional Japanese foods, particularly rice, were lower. Current policies that increase the price to consumers of traditional and locally-produced foods may be counterproductive to increased self-sufficiency when their impact on consumer choice is taken into account.
 - A non-distorting agricultural policy that is balanced across commodities is likely to increase the quantity and variety of agricultural production in the long run. Reducing market distortions will lead to more effective use of farmland and is expected to improve food security through enhancing the production of commodities other than rice.
 - Economic Partnership Agreements with food exporting countries are one of the most promising ways to stabilize and diversify food imports, along with multilateral trade liberalisation. Access to a secure food supply is better guaranteed through stable long-term relationships with exporting countries that avoid the need to purchase in the more volatile spot market. Diversifying supply from multiple importers can mitigate the risks of production shocks from weather events. Long-term contracts can reduce price risk by avoiding the more volatile spot market.
5. Rural policy should be distinguished from agricultural policy. The importance of agriculture in the rural economy has diminished to the point where agriculture can no longer be seen as the main driver of the rural economy. Today, the future of the rural economy depends on many of the same factors that drive urban growth—provision of good health, education, and other community services that attract residents and support business development. A focus on the agricultural sector for rural development risks being less effective and complicates agricultural policy, which should be freed to focus on sector-specific issues.
- Areas of particular multi-functional significance but which suffer from a weak resource base are a challenge for policy makers, as efforts to maintain agricultural production in these less-favoured areas can conflict with objectives of increasing competitiveness through structural reform. Resolving this conflict will involve a careful targeting of measures to identified multifunctional characteristics in a way that does not unduly influence commodity production.
 - A focussed approach to multi-functionally significant agricultural areas is more likely to be successful. A priority-setting exercise to identify high-valued characteristics and the areas that typify them will allow other areas to more freely

adapt to the changes demanded by the marketplace. (e.g. regional “nature” parks act to preserve important land while allowing development elsewhere).

- The general tax and social security system may be better placed to address urban-rural income disparity issues than would be an agricultural policy. It would likely also be more equitable with respect to providing support to all rural residents who need it.
6. Many commodities enjoy significant trade protection, as evidenced by the fact that market price support and output payments make up more than 90% of all agricultural support. Increased trade would benefit Japanese consumers, and will become increasingly important for producers as well. High border protection insulates domestic producers from competition and can reduce their competitiveness in export markets, and the growth potential of the sector. Natural demographics combined with changing dietary habits will reduce the size of the domestic market over time. This, and other trends, will affect some commodities more than others. Opportunities for growth will therefore come increasingly from new markets abroad for high-quality Japanese products. Already, more than 30% of paddy land is diverted from rice production to balance the domestic market at the current price. Moreover, higher prices through trade protection are a relatively ineffective means of improving farm income.
- The reductions in trade protection required to improve the efficiency and competitiveness of the sector should be combined with market promotion efforts, both domestically and overseas, that will promote Japanese products and help the sector take advantage of new trade opportunities.
 - Research and development to improve the already high quality of Japanese agricultural products will help the sector exploit the growing market for very high quality products with exceptional food safety characteristics.
 - Efforts to open agricultural markets should be continued. Japan should pursue additional trade agreements, while working towards a successful conclusion of the Doha round of multilateral trade negotiations. State trading enterprises could be reformed to allow for increased competition, and the tariff system modified to reduce tariff peaks, and increase trade generally.
7. A sustainable agricultural sector depends on good environmental performance. Modern agricultural production demands the use of chemicals and fertilisers, which inevitably raises the risk of pollution originating from agricultural production. Farmers should be aided in their efforts to improve the environmental characteristics of their operations, all the while respecting the polluter-pays principle.
- The reform of more distorting forms of support will help to improve environmental performance through more optimal use of inputs.
 - Farm consolidation will also be of benefit, as it has been demonstrated that larger business-oriented operations tend to have a more balanced use of chemicals and fertilisers.

- Cross-compliance conditions can be a useful adjunct to agricultural support programmes. The use of cross-compliance should be reviewed and evaluated to ensure that it results in the desired actions on the part of farmers.
- On-farm services can help farmers better manage their operations and their use of chemical inputs. In particular, soil testing and the use of economic thresholds for chemical applications should be promoted and supported.

Conclusion

Japanese agriculture has undergone a long process of transformation from traditional methods to a modern agricultural sector. The challenge for policy makers is to complete this evolution while ensuring that agriculture continues to play the many roles desired by the Japanese people. The move towards more competitive production methods and increased efficiency is both necessary and inevitable, and recent policy moves have acted to encourage and support improvements in efficiency, in particular with respect to the scale of operations.

Japan's rural communities have been shaped by the close personal relationships and mutual trust that is formed when many small farm operations jointly manage common property and cooperate in agricultural production, typically to support communal irrigation systems for rice. However, structural adjustment will concentrate land in the hands of a smaller number of innovative producers, which will lead to a change in the relationship between community members. The success of structural adjustment will depend in part on the ability of communities to establish new cooperative relationships between farm households and land-owning non-farmers who will form the majority of the rural population.

The level of support provided to agriculture in Japan has been high relative to the OECD average since the OECD began measuring support in member countries, and there exists considerable scope to reduce the role of support in the sector and in the decision-making of farmers. Such a move to lower support levels and improve its composition should be seen as the main means through which improvements in the competitive structure of agriculture will be obtained.

The first step in this process is ensuring that farmers have the opportunity to compete with other farmers domestically. Policies that restrict supply of certain commodities or that act to favour the production of certain commodities over others prevent domestic farmers from responding to the preferences of consumers by adjusting their production to meet the demands of the marketplace. This step should be followed by reducing trade barriers that retard competitiveness, reduce opportunities to exploit new markets abroad, and prevent the economy as a whole from benefitting from increased trade and improved trade relations.

There are strong indications that agriculture in Japan can survive and thrive in a more open marketplace. Producers of Wagyu beef, fruits and vegetables are already able to capitalise on their advantages in meeting domestic demand through their proximity to market and better understanding of the particular tastes of the Japanese consumer. It is likely that producers of other commodities, in particular rice, share some of these same advantages and would compete successfully in a globalised marketplace. The scarcity of land is certainly a constraint, but it does not necessarily determine the competitiveness of the agricultural sector. The potential of competitive agriculture should be pursued by

exploiting Japan's advantages such as its highly educated labour force, its leading position in technology and sophisticated infrastructure.

That is not to say that the agricultural sector would continue in its current form were domestic and trade supports to be reduced. Japanese farmers will always find it difficult to match low-cost producers of bulk tradable commodities such as animal feeds, and so they need to focus on their comparative advantages. This will involve not only better meeting the needs of the domestic market, but also through production of high-quality and premium products which would be able to compete abroad. Globalisation moves in both directions, and consumers outside Japan recognise the uniqueness of Japanese cuisine and will continue to increase their consumption of Japanese products as diets diversify worldwide. Sushi is an example of a successful cultural export, and one that can be repeated if allowed.

The sector has great potential, both in terms of productive capacity and the potential to produce new, higher valued products. The sector has seen limited growth and stagnant income in recent years but policy reforms recently undertaken and those recommended here will help to redress this situation. What form agriculture would take in the future is difficult to say, but reforms allowing greater opportunities to farmers to operate in a more open and competitive environment, both domestically and in foreign markets, are essential to secure long-term growth and competitiveness of agriculture in Japan.

Basic Statistics of Japan

LAND			
Area (1 000 sq.km), 2006	377.9	Major cities, 2006 Population census (million inhabitants).	
Cultivated agricultural land (1 000 sq.km), 2004	47.3	Tokyo (23 wards)	8.5
Forest (1 000 sq.km), 2004	250.9	Yokohama	3.6
Density inhabited districts that exceed 5 000 persons per sq.km (1 000 sq.km), 2005	12.6	Osaka	2.6
		Nagoya	2.2
		Sapporo	1.9
		Kobe	1.5
		Kyoto	1.5
POPULATION			
Population, August 2007 estimate (1 000)	127 785	Labour force in per cent of total population, 2007	52.2
Number of persons per sq.km in 2005	342.7	Percentage of distribution of workers, 2007	
Percentage of population living in densely inhabited districts in 2005	66.0	Agriculture and forestry	3.9
Net annual rate of population increase (2000-2005)	0.1	Manufacturing	18.2
		Service	64.2
		Other	13.7
PRODUCTION			
Nominal gross domestic product in 2007 (JPY trillion)	515.7	Share of agriculture, forestry and fisheries in gross domestic product, at producer prices in 2006 (per cent)	1.5
Growth of real GDP, 2007	2.1	Share of manufacturing in gross domestic product, at producer prices in 2006 (per cent)	21.6
Gross fixed investment in 2007 (per cent of GDP)	22.3	Growth of industrial production, per cent 2007	2.7
Growth of real gross fixed investment, 2007	-0.3		
GOVERNMENT			
		House of Representatives	House of Councillors
Public consumption in 2007 (in per cent of GDP)	17.6	Composition of Parliament, January 2008	
Current public revenue in 2006 (in per cent of GDP)	34.5	Liberal Democratic Party	304
Government employee in per cent of total employment, 2007	9.7	Democratic Party	113
		Peace and Reform (Komei)	31
		Communist Party	9
		Others	22
		Vacancy	1
		Total	480
		Last elections	Sep-05
			Jul-07
FOREIGN TRADE AND PAYMENTS			
	(2007, JPY trillion)	Exports	Imports
Commodity exports (fob)	79.7		
Commodity imports (fob)	67.3	By country (per cent)	
Services	-2.3	United States	20.1
Investment income	16.3	European Union	14.7
Current balance	25	Asia	48.1
Exports of goods and services (in per cent of GDP)	17.6	Other	17.0
Imports of goods and services (in per cent of GDP)	15.9	By commodity	
		Food stuff	0.5
		Mineral fuels	1.2
		Machinery and transport equipment	64.8
		Other	33.5
CURRENCY			
Monetary unit : Yen		Currency unit per USD, average of daily figures	
		Year 2007	117.8
		January 2008	107.7

Source: OECD Economic Survey of Japan 2008.

Annex 1.

The Japan PEM Module

The PEM module for Japan was first built between 1998 and 2001 as part of the initial phase of overall PEM development. Aside from the addition of the beef and dairy modules, a common modification of all PEM regions that was carried out in 2005, the module has seen no substantive update since that time. Therefore, the production of this study of Japanese agricultural policies afforded a timely opportunity to revisit and update the representation of Japanese policy in the PEM.

In addition to a review and update of the main data and parameters used in the Japanese module of PEM, two main modifications to the structure of the model were undertaken. These were an explicit representation of the TRQ for rice imports, and land market controls under the production adjustment program for rice.

Data concerning the factor shares in production for represented commodities come from the Japan Agricultural Yearbook. This source represents government survey data of the production costs of different farm enterprises, expressed both in terms of cost per hectare and cost to produce a specific quantity of output. As factor shares in the model are expressed in proportional terms, either one of these expressions of production cost will work.

These data show that the farmer's own labour and the (explicit or implicit) rental cost of land are the major components of the farm's cost structure, with labour costs significantly higher than all other costs (Table A1). Factor cost shares for rice are updated every year in the database while cost shares for other commodities are static. Certain studies (for example Fujiki, 2000) contend that the labour cost in rice production is overestimated and land costs underestimated in official cost statistics. The reason why this might be the case has to do with identifying the proper opportunity cost of labour and the use of standard rents when costing paddy land.

In order to provide a perspective on the effect of alternative hypotheses regarding the relative intensities of land and labour in production, some of the simulations carried out in Chapter 2 contain sets of results reflecting these alternatives. Specifically, the relative magnitudes of the farm-owned capital (which is principally the farmer's own labour) and land shares are reversed, using a farm capital share of 0.17 and a land share of 0.35. In addition, the base demand elasticity for rice, which is -0.55 is altered in an "inelastic demand" alternative value of -0.1.

Table A.1. Factor cost shares

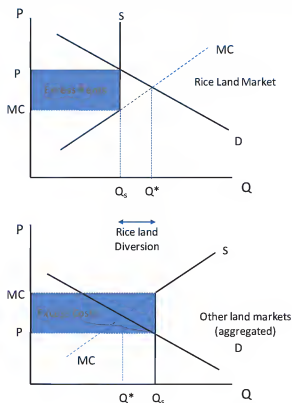
	Wheat	Coarse grains	Oilseeds	Rice	Milk	Beef
Farm-owned capital	0.17	0.23	0.38	0.37	0.25	0.17
Land	0.39	0.23	0.22	0.15	0.12	0.04
Cows	0	0	0	0	0.17	0.04
Hired labour	0.01	0.01	0.01	0.02	0.02	0.02
Other purchased inputs	0.10	0.11	0.11	0.14	0.04	0.05
Concentrated feeds	0	0	0	0	0.32	0.62
Chemicals	0.06	0.03	0.07	0.05	0	0
Energy	0.02	0.03	0.02	0.03	0.02	0.02
Fertiliser	0.11	0.13	0.07	0.06	0	0
Insurance	0	0	0	0	0	0
Irrigation	0	0	0	0	0	0
Interest	0	0	0	0	0.04	0.02
Machinery and equipment	0.13	0.22	0.13	0.19	0.03	0.03

Modelling the Rice Production Adjustment Programme

The rice production adjustment program is represented in the model as a reduction in allowable land used for rice production, defined with respect to the equilibrium land quantity. This reduction is matched with an increase in land used for other uses by the same quantity above the equilibrium amount in those land markets (Figure A.1). This reflects the view that the program moves land from rice production to other uses, and that without the diversion program, some land would optimally be moved from other uses into rice production. The amount of land diverted from rice production therefore enters the model as an exogenous policy variable, and as a consequence there is no endogenous responsiveness either in the amount of rice land or the aggregate total of other land uses. More specifically, the amount of land used in rice (or other uses) will not adjust to changes in prices in the model so long as the price of land exceeds its marginal cost. In the base calibration of the model, price exceeds marginal cost in the rice land market because the quantity is kept below the equilibrium amount. In the same manner, marginal cost exceeds the land rental price in other land uses as land is diverted unprofitably into alternative uses (producers receive a payment under the program to compensate them for this cost)¹.

1. This payment is classified in the PSE in category E, as production is not required to receive the payment. It therefore appears in the model in the same manner as any payment made on a historical entitlement basis. See [AGR/CA/APM(2005)30] for more details regarding how this type of policy is represented in PEM.

Figure A.1. Land markets under the Production Adjustment Programme



The quantities P and Q_s in each market are identified using the basic model data. These are the “observed” market price and quantity supplied. The marginal cost of production is not observable and must be specified in order to locate the underlying supply function. This is done using the slope of the supply/marginal cost function, determined by the supply elasticity parameter, and the difference between actual supply Q_s and the equilibrium supply level Q^* .

The difference between Q_s and Q^* is challenging to identify. It is not simply the amount of land diverted under the program, because not all diverted land is expected to return to rice production were the production adjustment program to be eliminated. Some is likely to remain in an alternative use, but a portion may also be expected to become or remain idle absent the program. MAFF estimates that of the 710 000 ha of paddy area diverted in 2006, about 330 000 ha may be expected to return to rice production. We take this estimate of 330 000 ha “effectively” diverted paddy land to be the difference between Q_s and Q^* . Thus, if in the model the production adjustment program is removed and no other policy shock is introduced, the amount of land used in the production of rice would

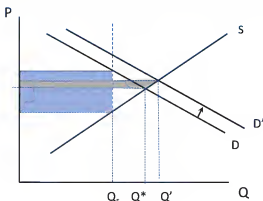
increase by 330 000 hectares and the amount of land in other uses would decrease by a similar amount.

Reducing the amount of land diverted under the production adjustment program effects producer welfare by reducing the amount of excess rent earned in the rice land market, and at the same time reducing the excess cost of land diverted into other uses. These need not be exactly offsetting as it depends on the value of Q , as well as the elasticities of supply and demand in each market. In general, the larger the share of land rental costs in the total cost of producing rice (factor cost share), the greater the amount of excess rent earned in the land market. This can be seen in the results of the simulation removing the adjustment program shown in section 2.5. Under the alternative hypothesis of a higher factor cost share of land, the welfare effect of the program on producers becomes significantly negative.

In addition to the erosion of rents that takes place from expanding rice production, there is also the possibility of generating additional producer surplus if endogenous changes in the model lead to a shift in the demand function for land (Figure A.2). Thinking about a shift in the restriction in the supply of land (Q_s) leftward, the excess rent in the rice land market is eroded until point Q^* is reached, where excess rents are completely exhausted. At this point, the change in farmers' welfare is equal to the negative of the initial level of excess rents, shown as the red area in Figure A.2. If the supply continues to expand beyond Q^* , say as a result of a shift in demand for land provoked by an increase in the price of rice, farmers would begin to accumulate an increase in producer surplus, shown as the green area in Figure A.2. The same is true for a leftward shift in the demand function.

To calculate the change in producer surplus, changes in the price and quantity of land must be evaluated with respect to the equilibrium point Q^* . Q^* is an intermediate point that does not form part of the model solution, but its value and associated price are retained from the initial calibration of the supply function. This value will change according to alternative values of factor cost shares and must be recalculated for each alternative.

Figure A.2. Welfare changes in the market for land for rice production



Identifying the natural premium for fluid milk

In the Japanese module of the PEM, the markets for milk for fluid or manufacturing uses are separate, and a price premium exists for milk sold into the fluid market. That is, the price paid for milk for fluid uses is higher than the price paid for milk used in manufacturing of processed dairy products. The amount of this premium can be observed from price data, and the model is calibrated such that this actual price premium is reflected in the model. Moreover, milk for fluid uses is assumed to be non-tradable in the model, such that domestic demand for milk for fluid uses will always be satisfied through domestic production. The price of milk for manufacturing is determined by an ad-valorem tariff and domestic producers face competition from imported dairy products (measured in raw-milk equivalent form). The producer price is taken to be the blend price (weighted average) of these two prices, and the competitive market assumption is maintained through the zero profit condition.²

With this framework in place, it is possible to ask the question of whether a natural fluid premium exists. Were border protection for milk products to be removed, the domestic price of milk for manufacturing uses would be aligned with world prices. Whether the domestic price of fluid milk would remain above this price depends on the market-clearing price in the autarkic domestic fluid milk market. In principle, the amount of the fluid premium depends primarily on the domestic elasticity of demand for fluid milk and the domestic supply elasticity for milk, and as well on the initial level of the fluid premium and the world price.

Another way of thinking about this is that a fluid premium may exist only if domestic producers decline to supply any milk into the manufacturing market at world prices. This is because if it is profitable to supply the manufacturing market at world prices, then it is profitable to supply the fluid market for the same price. The supply of milk for manufacturing practically speaking is the residual of supply after the fluid market is satisfied at prevailing prices. While the markets are segmented, milk producers have no market power to demand monopoly rents in the fluid market. If producers supply no milk into the manufacturing market, then they require a price greater than world price to supply milk, and so the equilibrium price for milk in the fluid market will be higher than the world price. The difference between this equilibrium price and the world price is a "natural" price premium, because it exists absent any policy intervention and represents the competitive market outcome.

Time paths of adjustment

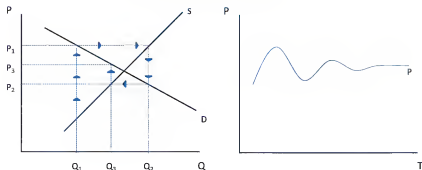
The PEM uses elasticities of demand from the OECD Aglink model that represent a medium-term, five year adjustment period. These elasticities are obtained by observing the change in demand resulting from a change in the demand price taken at year five of the 10-year projection produced by the Aglink model. As a comparative-static model, the outcomes from policy simulations in the model reflect a new equilibrium that may be compared with the initial calibrated state, or base equilibrium, of the model.

2. In practice, the price for fluid and manufacturing milk is negotiated between the co-operative of milk suppliers and milk processors. Depending on how these negotiations take place in practice, the outcome may reflect monopoly or monopsony power on the part of the negotiating parties. The PEM does not attempt to take such market dynamics into account and assumes no monopoly rents exist.

What happens to prices and quantities in the process of adjustment from the base equilibrium to the new equilibrium arising from a policy scenario can be important if the process of adjustment is not smooth, or otherwise occurs in an abrupt or unpredictable manner. For example, one may postulate a situation where a significant constraint on production is removed and where the immediate response by all producers is to increase production. If the subsequent increase in supply into the market leads to a collapse in the price, producers may then react to the price change by reducing production significantly. Such a pattern of price and production oscillation can be damaging as it can lead to variability in profitability and otherwise generate market uncertainty.

Such oscillations can occur when there is a delay between the supply decision and the observation of the sale price. This phenomenon was first described by Kaldor (1934), who coined the term “cobweb” to describe it. The name derives from the appearance of the path of price- and quantity-adjustment when shown graphically in price-quantity space (Figure A.3). In the first panel of Figure A.3, the quantity supplied starts at Q_1 . The resulting demand price for that amount is P_1 , which leads to a quantity adjustment to Q_2 , and so on until equilibrium is reached. The second panel shows the change in price over time related to pattern of price and quantity adjustment.³

Figure A3. The cobweb model



The price oscillations seen in the cobweb model are just one possible form of price adjustment. For example, in the Aglink model, one of the key factors in the adjustment path towards equilibrium is lags in adjustments of the optimal herd size for beef operations. Biological limits in the expansion rate of the herd size, and the connection with the quantity of beef supply (cows sold for beef cannot be kept to increase the size of the breeding herd) mean that it can take several years for adjustments to fully take place. In general, efficient markets and the small size of agriculture relative to the total economy imply that price and quantity adjustments would take place fairly early in the five-year period considered in the PEM.

3. The cobweb model rests on the assumption that suppliers form their expectations of future prices on past prices. This is termed “adaptive expectations” and can be compared with “rational expectations” where suppliers take all available information into account when forming a price expectation. The size of the oscillations depends on the elasticities. When demand is very inelastic, for example, the price oscillation will be of greater magnitude and longer duration.

There are several ways of dealing with the uncertainty surrounding the nature of market adjustments to policy changes. For example, safety-net style policies that ensure a minimum level of farm income would make payments to producers were prices to decline significantly, thus moderating the impact of price variability on farm income. Such policies are already in place for many agricultural commodities in Japan. Adjustment policies that anticipate the effects of a policy reform and provide assistance to producers to adjust to those changes or transition out of the sector can also help, and have a recognised role to play in policy reform. Finally, policy reform may be carried out in stages over time such that the amount of adjustment in any one year is reduced, thus reducing the scope for price oscillations as seen in the cobweb model. All three of these possibilities are foreseen as potentially appropriate for agricultural policy reform in Japan and are more fully discussed in chapter three.

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